



FRIDAY, AUGUST 20.

Train Accidents in July.

The following accidents are included in our record for the month of July:

REAR COLLISIONS.

On the 2d a passenger train on the Intercolonial road ran over a misplaced switch and into another passenger train on a siding at Paines Junction, N. B., doing some damage.

On the morning of the 12th, a freight train on the Pennsylvania Railroad ran into a preceding freight, which had stopped to switch some cars at Woodvale, Pa. Several cars were damaged and the road blocked an hour.

On the afternoon of the 12th, a freight train on the Wabash, St. Louis & Pacific road ran into the rear of a stock train near Wabash, Ind., wrecking the caboose and killing a driver.

Early on the morning of the 20th, a freight train on the Hartford & Connecticut Valley road ran over a misplaced switch and into some passenger cars standing on a siding in Hartford, Conn. The passenger cars were damaged and several freight cars piled up on the tender in a bad wreck. The conductor was killed, the engineer and fireman badly hurt.

On the morning of the 22d an excursion train on the Grand Trunk road ran into the rear of a regular passenger train which had stopped in Montreal, P. Q., to allow a freight train to get out of the way. An engine and two cars were damaged.

On the 22d a freight train on the Cincinnati, Hamilton & Indianapolis road ran into the rear of another freight which had stopped at Connersville, Ind., damaging the engine and one car and injuring a fireman.

Early on the morning of the 23d a helping engine on the Baltimore & Ohio road ran into the rear of a freight train which was going into a siding in Wheeling, W. Va., wrecking the caboose.

On the 23d a yard engine ran into the rear of a passenger train standing on the Indianapolis & St. Louis track in Indianapolis, Ind., doing a little damage.

On the evening of the 24th a freight train on the Baltimore & Ohio road ran into the rear of a repair train in Cumberland, Md., wrecking two cars and injuring a laborer.

On the 26th a special passenger train on the Kansas Pacific road ran into the rear of a freight train near Lawrence, Kan., damaging several cars.

On the afternoon of the 26th a passenger train on the Ninth Avenue Line of the Manhattan Elevated road ran into the rear of a preceding train at the Fifty-ninth street station in New York, doing a little damage.

On the afternoon of the 26th a ballast train on the Baltimore & Ohio road ran into the rear of the wrecking train, which was standing on the track in McKeesport, Pa., damaging several cars and injuring three men.

On the night of the 26th a freight train on the New York, Lake Erie & Western road ran into a preceding freight at Almond, N. Y., wrecking the caboose, damaging several other cars and injuring two tramps who were stealing a ride. The road was blocked all night.

On the 27th a freight train on the St. Paul & Duluth road ran into some cars which had been left standing on the main track in St. Paul, Minn. The engine and cars were slightly damaged.

On the afternoon of the 27th a yard engine, pushing some cars in the Lake Shore & Michigan Southern yard in Fremont, O., ran into the rear of a freight train, damaging several cars.

BUTTING COLLISIONS.

On the 4th there was a butting collision between a passenger and a freight train on the Nevada County road, near Grass Valley, Cal., by which some damage was done.

Very early on the morning of the 17th there was a butting collision between two freight trains on the Keokuk & Des Moines Division of the Chicago, Rock Island & Pacific, near Ottumwa, Ia. Both engines and several cars were damaged. The conductor of the west-bound train had been waiting on a siding for an east-bound train in three sections. He allowed two to pass and then hauled out and met the third.

On the morning of the 23d there was a butting collision between two freight trains on the Louisville, Cincinnati & Lexington road near Woodlawn, Ky. Both engines and a car were damaged and the road blocked four hours.

On the afternoon of the 23d there was a butting collision between a passenger and a freight train on the Junction Branch of the Savannah, Florida & Western road, near Savannah, Ga. Only slight damage was done. The freight engine reversed and then jumped, and his engine ran away.

Very early on the morning of the 24th a passenger train on the Indianapolis, Decatur & Springfield road ran into the head of a freight which was just coming up to a siding at Dana, Ind. Both engines were badly broken, and a fireman hurt. The accident is said to have been caused by a careless brakeman, who signaled all right to the passenger train before the freight reached the siding.

On the 25th there was a butting collision between two freight trains on the Lake Shore & Michigan Southern road, near the bridge over the Maumee, in Toledo, O., by which both engines and several cars were damaged.

On the 25th there was a butting collision between two freight trains on the Marietta & Cincinnati road, near Loveland, O., by which both engines and several cars were damaged.

On the night of the 25th there was a butting collision between two freight trains on the Wabash, St. Louis & Pacific, near Williamsport, Ind. Both engines and several cars were damaged.

On the night of the 26th there was a butting collision between two passenger trains on the Atlantic Division of the Long Island road, near Flatbush avenue station, Brooklyn, N. Y., by which some damage was done and the road blocked for an hour. The accident was caused by a misplaced switch.

On the 28th there was a butting collision between two freight trains on the Cincinnati Southern road, near Somerset, Ky., by which both engines and several cars were damaged.

On the evening of the 31st there was a butting collision between an excursion and a local passenger train on the Long Island road, near Morris Grove, N. Y. Both engines were wrecked, one engineer killed, the other engineer, a conductor, a brakeman and two passengers slightly hurt. The local train was behind time, and should have gone on a siding to wait for the excursion train, but did not, for some reason unknown.

CROSSING COLLISIONS.

On the evening of the 10th a Wabash, St. Louis & Pacific

freight train ran into a Toledo, Delphos & Burlington passenger train at the crossing of the two roads near Toledo, O. The car was slightly damaged; a young lady jumped down from the platform, was caught under the car, and was killed.

On the 16th a West Jersey passenger train struck a Philadelphia & Atlantic City passenger train at the crossing in Camden, N. J., throwing the engine and baggage car over off the track.

DERAILMENTS, BROKEN RAIL.

Very early on the morning of the 19th an excursion train on the Wabash, St. Louis & Pacific road struck a broken rail near Knox, O., and six cars were thrown from the track and down a bank. Several of the cars were upset and one was completely broken up. One passenger was killed, three fatally injured and 22 less severely hurt, besides a number slightly bruised.

DERAILMENTS, BROKEN AXLES.

On the night of the 6th the engine of a coal train on the Philadelphia & Reading road was thrown from the track in Reading, Pa., by a broken axle, blocking the road several hours.

Very early on the morning of the 15th a freight train on the Troy & Boston road was thrown from the track near Lansingburg, N. Y., by a broken axle, 24 cars leaving the track, of which 13 were piled up in a bad wreck, injuring a brakeman slightly and blocking the road all day.

On the morning of the 20th several cars of a freight train on the Painesville & Youngstown road were thrown from the track in Warren, O., by the breaking of an axle under an ore car.

DERAILMENTS, BROKEN BRIDGE.

On the night of the 11th a coal train on the Belvidere Division of the Pennsylvania Railroad broke through a trestle near Andover, N. J., and 15 coal cars went down in a bad wreck.

On the 15th a freight train on the Kansas Division of the Union Pacific road broke through a bridge near Hugo, Col., the abutments of which had been washed out by a sudden storm. Ten cars went down into the creek and were wrecked.

DERAILMENTS, SPREADING OF RAILS.

On the afternoon of the 5th a passenger train on the Addison road ran off the track on the approach to the bridge across Lake Champlain near Larabee's Point, Vt. The accident is said to have been caused by the spreading of the rails.

On the afternoon of the 10th the engine and four cars of a freight train on the New Brunswick & Canada road were thrown from the track near McAdam Junction, N. B., by the spreading of the rails, the ties having been burned out by a fire in the woods. For a while the derailed train was surrounded by fire, and the men on it in great danger.

On the afternoon of the 13th the engine and one car of a passenger train on the Pittsburgh Southern Railroad were thrown from the track near Upperman, Pa., by the spreading of the rails.

DERAILMENTS, WASH-OUT.

On the evening of the 10th a passenger train on the Green Bay & Minnesota road ran into a washed-out culvert near Arcadia, Wis., the engine going down into the gap with the baggage car on top of it. Both were badly broken, the engineer killed, the fireman and mail agent badly hurt. The culvert was dry only an hour before.

On the night of the 12th, a passenger train on the Burlington & Missouri River in Nebraska, ran into a wash-out near Naponee, Neb. The engine went down and was wrecked, killing the engineer and fireman.

On the afternoon of the 13th a freight train on the Jamestown & Franklin Branch of the Lake Shore & Michigan Southern road ran into a wash-out near Ashtabula, O., and nine cars were piled up in a bad wreck.

On the 15th a freight train on the Atchison, Topeka & Santa Fe road went into a wash-out near Santa Fe, N. M., and 13 cars were piled up in a bad wreck, injuring three train-men.

On the night of the 19th a freight train on the Baltimore & Ohio road ran into a wash-out near Martinsburg, W. Va., the engine and 12 cars were wrecked and the track blocked several hours.

DERAILMENTS, ACCIDENTAL OBSTRUCTION.

On the night of the 2d several cars of a freight train on the New York, Lake Erie & Western road were thrown from the track near Rutherford, N. J., by a brake-beam which fell upon the track.

On the morning of the 14th a freight train on the Pennsylvania Railroad ran into a large tree which had been blown down across the track near Blainsville, Pa., a few minutes before. The engine was thrown from the track and badly damaged and the fireman hurt.

On the 20th a coal train on the Intercolonial road was thrown from the track near New Glasgow, N. S., by the dump-bottom of a car which got loose and hung down until it caught in a switch and forced it open. Twelve cars were piled up and wrecked.

DERAILMENTS, CATTLE.

On the afternoon of the 1st a passenger train on the Philadelphia & Reading road ran over a cow near Mt. Carbon, Pa., and two cars were thrown from the track.

On the morning of the 5th a freight train on the Ft. Wayne, Muncie & Cincinnati road ran into a drove of cattle near Muncie, Ind. The engine and several cars were thrown from the track and badly damaged.

On the 7th a freight train on the Illinois Central road ran over a cow at Woodstock, Ill., and eight cars were thrown from the track and badly broken.

On the afternoon of the 10th a freight train on the Kansas City, St. Joseph & Council Bluffs road ran over a cow near Kansas City, Mo., and nine cars were thrown from the track, went down a bank and were piled up in a bad wreck. Two tramps, who were stealing a ride, were killed.

On the 15th a passenger train on the Northern Central road ran over a bull near York Haven, Pa., and the baggage and mail cars were thrown from the track, causing some delay to trains.

On the 20th a freight train on the Jeffersonville, Madison & Indianapolis road ran over some cows near Flatrock, Ind., and three cars were thrown from the track.

On the night of the 23d a passenger train on the Atlanta & Charlotte Air Line ran over a cow near Seneca, S. C., and the engine and mail car were thrown from the track. The engineer was hurt.

DERAILMENTS, MISPLACED SWITCHES.

On the night of the 6th three cars of a freight train on the St. Paul, Minneapolis & Manitoba road were thrown from the track in the yard at St. Paul, Minn., by a misplaced switch.

On the night of the 10th a freight train on the Central Vermont road was thrown from the track by a misplaced

switch at St. Johns, P. Q. The engine and two cars were badly damaged and the station platform torn up.

Very early on the morning of the 15th a passenger train on the Terre Haute & Indianapolis road was thrown from the track at Amo, Ind., by a misplaced switch. The engine went down a bank with the mail and baggage cars on top of it, and these cars were badly wrecked; three passenger cars left the track but were not much damaged. A tramp, who was stealing a ride, was fatally hurt; the engineer, fireman, express messenger and two postal clerks less severely injured.

Early on the morning of the 26th the engine and three cars of a freight train on the Baltimore & Ohio road were thrown from the track at McKeesport, Pa., by a misplaced switch. The engine upset down a bank and the cars were piled up on top of it and badly broken.

DERAILMENTS, UNEXPLAINED AND MISCELLANEOUS.

On the afternoon of the 3d a car of a coal train on the Central Railroad, of New Jersey, ran off the track in Bergen Point, N. J., and 11 cars were piled up together in a bad wreck, blocking the road two hours.

Early on the morning of the 4th a freight train on the Chicago & Alton road ran off the track near East Mexico, Mo., and the engine and 14 cars were wrecked. The engineer and fireman were hurt.

On the afternoon of the 5th the engine and one car of a passenger train on the Connecticut River road ran off the track near Chicopee Centre, Mass. Both upset down a bank, and the engine was badly damaged.

On the afternoon of the 11th a car attached to a construction train on a new branch of the Missouri, Iowa & Nebraska road, ran off the track near Centerville, Ia., and was thrown down a bank and badly broken, injuring eight persons, besides a number slightly bruised.

On the 12th a long train of empty coal cars on the Belvidere Division of the Pennsylvania Railroad broke loose from the engine in Phillipsburg, N. J., and ran back down the grade, jumping the track at its foot, where 28 cars were piled up in a bad wreck.

On the 13th three cars of a freight train on the Pittsburgh, Ft. Wayne & Chicago road ran off the track in Ft. Wayne, Ind., and were damaged.

On the afternoon of the 13th the engine of a freight train on the Jeffersonville, Madison & Indianapolis road ran off the track in Indianapolis, Ind., blocking the track for a time.

On the morning of the 20th the engine of a freight train on the Cincinnati, Indianapolis, St. Louis & Chicago road ran off the track in Shelby, Ind., blocking the road several hours.

On the night of the 20th a freight train on the Indianapolis & St. Louis road ran off the track near Mattoon, Ill., blocking the road six hours.

On the 21st a freight train on the Central Vermont road ran off the track at North Charlestown, Vt., blocking the road several hours.

On the 21st several cars of a freight train on the Minneapolis & St. Louis road were thrown from the track near White Bear, Minn., doing some damage.

On the 22d some cars of a freight train on the St. Paul & Duluth road ran off the track near Pine City, Minn., blocking the road some hours.

On the afternoon of the 23d the engineer of a freight train on the Junction Branch of the Savannah, Florida & Western road reversed his engine to avoid a collision near Savannah, Ga., and then jumped. The engine ran back into the Savannah yard at a high speed, ran through the yard off the end of a siding and across a street striking a large tree and the corner of a house, demolishing these obstructions and wrecking four cars and the engine.

On the night of the 26th a freight train on the Charleston & Savannah Railroad ran off the track near Ashpoo, S. C., blocking the road five hours.

On the afternoon of the 27th the rear coach of a passenger train on the Jeffersonville, Madison & Indianapolis road jumped the track at Crothersville, Ind., and was thrown over against a freight engine standing on a siding. The car was badly broken and two train-men and eight passengers hurt.

On the 30th a repair train on the Old Colony road ran off the track near Fall River, Mass., wrecking several cars and injuring five laborers.

BOILER EXPLOSION.

On the afternoon of the 5th a yard engine on the Indianapolis, Peru & Chicago road exploded its boiler at Peru, Ind. The engine was destroyed, the yard-master killed, the engineer, fireman and a brakeman badly hurt. The engine was an old one, but supposed to be in good order.

OTHER ACCIDENTS.

On the afternoon of the 1st the baggage car of a passenger train on the Junction & Breakwater road caught fire near Harrington, Del., and was entirely destroyed. The fire was caused by sparks from the engine.

On the morning of the 14th a construction train of flat cars, with a large number of laborers on board, was running backward on the Montauk Division of the Long Island road near East Rockaway, N. Y., when it reached a point where some men were lowering a large derrick which had stood by the track. A heavy wire rope was stretched across the track just high enough to clear the rear car, and it swept over the car, knocking off the men in a heap under and around the following cars. Six men were fatally and 20 less severely hurt.

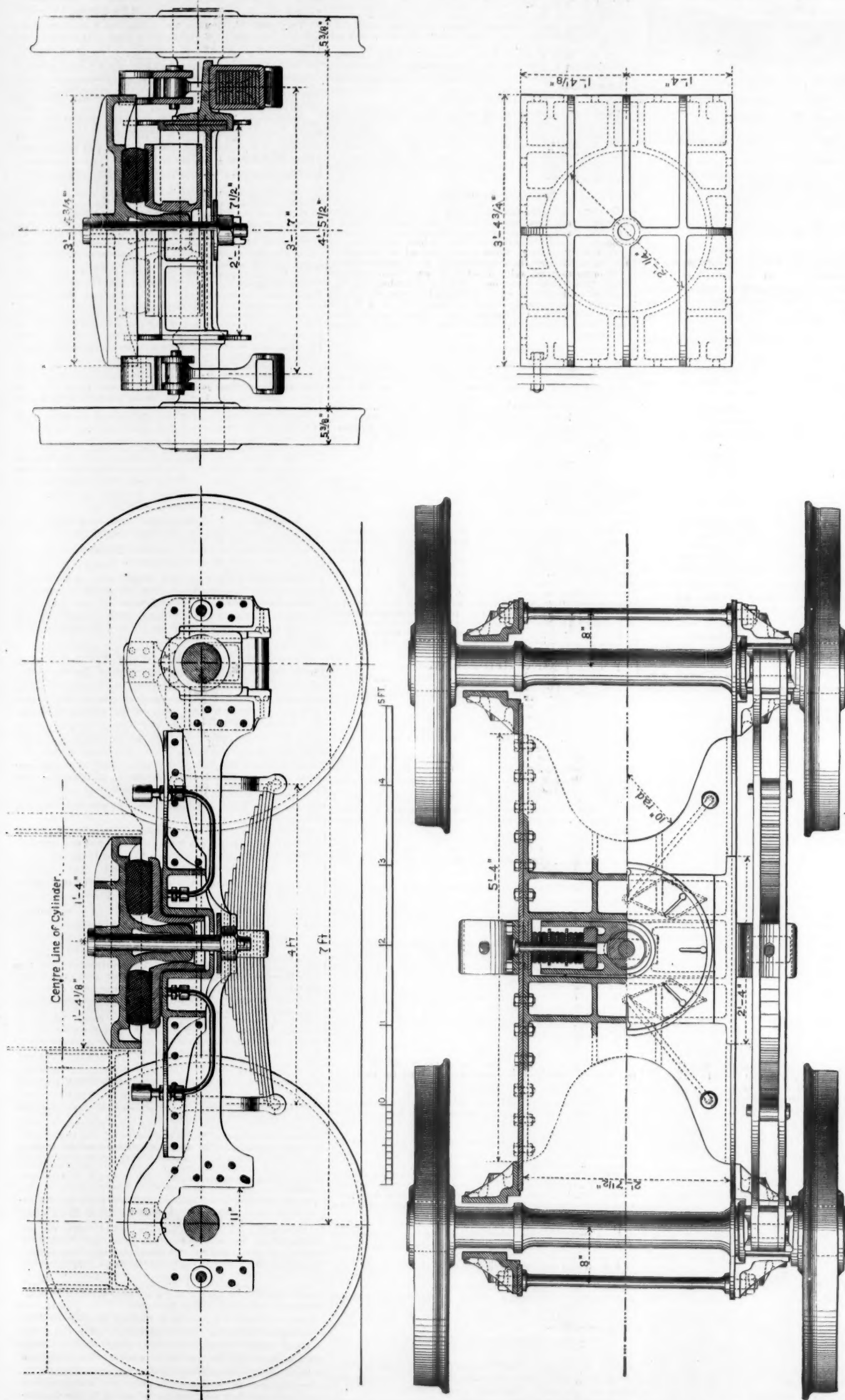
On the 15th a freight train on the Pennsylvania Railroad struck a large tree which had fallen across the track in the Packsaddle, Pa. The train was not thrown from the track, but the tree swept all the upper works off the locomotive, damaging it badly. The engineer could not call for brakes, the whistle having been carried away, but he managed to drop off and jump on the caboose, where he gave the alarm and the train was stopped after running a mile. The fireman was hurt.

On the morning of the 18th a passenger train on the Central Railroad of New Jersey crossed the draw-bridge over Newark Bay near Bergen Point, N. J., when the bridge-tender had just closed it, but had not yet had time to remove the long lever by which the draw is worked. This lever struck the first car and tore out the sides of two cars, damaging them badly and injuring a passenger. The cars did not leave the track.

On the 28th the engine of a passenger train on the West Jersey road broke a parallel rod when near Woodbury, N. J. The engine was not seriously damaged.

This is a total of 78 accidents, whereby 21 persons were killed and 100 injured. Eleven accidents caused the death of one or more persons; 15 caused injury but not death, while in 52, or 66.7 per cent. of the whole number, there was no injury severe enough for record.

As compared with July, 1879, there was a decrease of three accidents, but an increase of seven in the number killed, and of 46 in that injured. There were several acci-



TRUCK OF EXPRESS ENGINES, GREAT EASTERN RAILWAY, OF ENGLAND.

Mr. Massey Bromley, Locomotive Superintendent.

dents in which the number of injured persons was large, although no great casualty is included in the record.

These accidents may be classed as to their number and causes as follows:

COLLISIONS:	
Rear collisions.....	15
Butting collisions.....	11
Crossing collision.....	2
DERAILMENTS:	
Broken rail.....	1
Broken axle.....	3
Broken bridge.....	2
Spreading of rails.....	3
Wash-out.....	5
Accidental obstruction.....	7
Cattle.....	7
Misplaced switch.....	4
Runaway engine.....	2
Unexplained.....	14
Boiler explosion.....	
Broken connecting-rod.....	1
Car burned while running.....	1
Accidental obstruction not causing derailment.....	3
Total.....	78

Three collisions were caused by misplaced switches; one by cars left standing on main track, and one by failure to use signals. Of the unusually large number of collisions most are unexplained, though we fear carelessness or stupidity would be the cause assigned for most of them, could they be sifted out.

There were, in general terms, 13 accidents traced directly to defect or failure of road or equipment; eight caused by the elements or the weather; 10 by unforeseen or accidental obstructions; 33 by carelessness or defects of management, and 14 were unexplained.

As to time, there were 48 accidents in daylight; 22 were at night, while in eight cases the time is not given.

A division according to classes of trains is as follows:

Accidents:	Collisions.	Derailments.	Other.	Total.
To passenger trains.....	6	11	3	20
To a passenger and a freight.....	8	—	—	8
To freight trains.....	14	33	3	50
Total.....	28	44	6	78
Casualties:				
Killed by.....	4	10	7	21
Injured by.....	15	60	25	100
Total.....	19	70	32	121

The number of accidents is fully up to the average, with the usual causes prevalent at this season. Wash-outs and cattle are numerous; misplaced switches continue to be with us at all seasons, seven accidents—three collisions and four derailments—being caused by them. Some singular and fatal accidents, caused by what we have called accidental obstructions, are noted. Two broken bridges are in the record; one was a wooden trestle, and the other failed on account of the washing out of an abutment. It may be noted as a little singular that nearly all the collisions were crowded into a few days toward the last of the month, but no particular reason can be given for it.

For the year ending with July the record is as follows:

	Number of accidents. Killed. Injured.	
August.....	79	19
September.....	78	8
October.....	104	35
November.....	86	16
December.....	69	18
January.....	62	11
February.....	64	16
March.....	65	9
April.....	71	11
May.....	46	30
June.....	56	15
July.....	78	21
Totals.....	858	209
Totals, same months 1878-79.....	837	213

The averages per day for the month were 2.52 accidents, 0.68 killed, and 3.23 injured; for the year they were, 2.34 accidents, 0.57 killed, and 2.18 injured. The average casualties per accident were, for the month, 0.269 killed, and 1.282 injured; for the year, 0.244 killed, and 0.931 injured.

Truck of Express Engines of the Great Eastern Railway.

We give this week a full-page engraving of the truck of the engine of which a general drawing was published last week. The following description of it is taken from the *Railway Engineer*:

The bogie used on these engines gives both a radial and lateral motion without the use of either links or vee planes, the weight of the engine being transmitted through the medium of a large india-rubber pad, and the side-play being controlled by the direct action of horizontal transverse springs (generally made of india-rubber), which tend to keep the bogie in a straight line. It is one of the most useful and widely adopted improvements made in locomotives during the last fifteen years, and at the risk of saying something already well-known to many of our readers, we propose to describe the form adopted on these engines, especially as Mr. Adams' bogie is little known in the United States, where what we in this country believe to be inferior and more complicated forms of "trucks" are in extensive use. Our American cousins may possibly be surprised to hear that with us bogie-wheel flanges stand rather better than those on other wheels, the general experience on the other side of the Atlantic being that only the hardest material, chilled cast iron, will bear the wear that engine truck wheels undergo, though steel can be used with advantage for driving and other tires. This is no doubt partly due to the absence or small amount of cant given to the rails in curves on American lines, the leading wheels of the engine having unaided to resist the centrifugal force, and perform the work of guiding the front end of the train round the curve; while the cant or super-elevation of the outer rails in this country, throws the centre of gravity nearer the inner rail, and creates a tendency in the whole train to slide from the outer rail toward the centre of the curve, and thus balance the effect of the centrifugal force. Our larger wheels no doubt also contribute to lessen the wear, but whatever the relative effect of these three causes, bogie, cant, and large wheels, may be, the result remains, that, as compared with America, we can in this country run bogie engines at higher speeds with less wear of flanges, and we think a principle cause is that the links by

which the side motion of an American bogie is controlled tend, when in a curve, to throw the engine out of the perpendicular, and conversely, when the two sides of the engine, owing to some inequality in the springs, etc., are not exactly level, the bogie is constantly thrust to one side, whether the engine is running on a straight road or not. The action of these links is really of a very complex character, and this is no doubt the reason why so many diverse opinions exist in the United States as to the relative merits of straight links, tee-headed links and links inclined inward and outward.

The Adams bogie, on the other hand, governs the side-play in a perfectly direct and straight-forward manner, and while it has no tendency to throw the engine out of the perpendicular, the rubber cushion, giving slightly at the sides, permits the bogie to roll in going over a rough joint or crossing without imparting a similar movement to the main body of the engine, thus, of course, greatly diminishing the force of the blow given by the wheels to the rails, and the corresponding jar sustained by the engine.

The pin of the bogie forms part of a casting which braces together the two cylinders and keeps them square, a duty shared by a somewhat similar casting which forms the bottom of the smoke-box. A circular lip, formed on the bottom of the lower casting, confines an india-rubber ring, measuring 2 ft. diameter and when uncompressed $4\frac{1}{2}$ in. thick. These rings require to be manufactured in a peculiar manner in order to stand well, but when properly made last for years. The rubber bears on a disk of sheet-brass $\frac{1}{4}$ in. thick, the lower side of which is lubricated with black lead and tallow, and moving round the bogie-pin on a lipped cast-iron slide, gives the radial motion. The slide in its turn bears on a cast-iron girder centre-piece, on which it slides transversely, the side-motion being governed by springs, as before stated. The slides are oiled by four oil-cups and the lubricant is well distributed by several large grooves cut in the bearing surfaces, which will then run for a year or more without galling, notwithstanding the small amount of motion, and the tendency of the cheap oils to oxidize or gum into a gluey paste. To keep the engine steady on a straight road, the springs should have some initial compression on them when the bogie pin is central. As will be seen from our illustration, the centre-piece is secured to two $\frac{1}{2}$ -in. plate frames, which are stiffened laterally by large flanges forming part of the centre casting. In order to make this casting as small as possible, and permit the springs to be easily accessible, the frames are placed only 2 ft. $7\frac{1}{2}$ in. apart; the hornblocks and spring-gear are thus outside, instead of, as is usual, inside the frames. The top of the spring-buckle is rounded and bears against a wrought-iron bracket secured to the side frame; a pin forged solid with the top of the buckle passes vertically through the bracket and is provided with a safety collar, so that should a spring or link break nothing can fall on the road. The springs are 4 ft. span and are composed of thirteen $\frac{1}{2}$ -in. plates, 6 in. broad, and put the weight on the axle-boxes through the medium of spring beams or cradles, each consisting of two plain plates 1 in. thick, 6 in. deep in centre, and 5 in. at the ends, where cast-iron distance-pieces are riveted between them and rest on the axle-boxes. A $2\frac{1}{2}$ -in. wrought-iron pin passes through the centre of the bogie, its object being to prevent the bogie leaving the engine in the event of either running off the metals.

Contributions.

Timber and Timber-Cutting for Railroads.

BY WM. S. HUNTINGTON.

(Concluded from page 429.)

Black Walnut.—Under most circumstances this timber is too valuable to be used for ties, but in some sections it is so plenty and cheap that it is used for all farm and building purposes. In the region where the writer is located some of the farms are fenced with black walnut rails, and the frames of buildings are made of this timber, and it is cut into boards for use in place of pine and other timber for building purposes. In some parts this timber is as cheap as oak, and is more durable than the best varieties of that timber. For gate or fence posts it is excellent, and for blocks to support the corners or joints of rail fences it has never been known to rot. It has all the requisites for a superior tie, and where ever they can be had at the price of the best oak they should be taken.

Black or Wild Cherry.—This timber, like the black walnut, is valuable, and like that timber is largely used for car-finishings, furniture, etc., etc., and owing to its value for fine work it is not always available for ties. But there are localities where it grows plentifully and may be had for ties at the prices of other first class timber. Like the walnut, there is scarcely any limit to its durability; it is a hard wood and very desirable for ties. It is sometimes called red cherry, from the color of the wood; the name "black" coming from its fruit, which is a jet black. Like the walnut, the sap of this timber seems to be a preservative. With the bark left on, the sap wood of the wild cherry rots very soon, but this is very thin, and its decay does not materially damage the tie, inasmuch as the colored wood remains sound for so long a period.

Black Ash.—There is a great variety of timber known under the name of black ash, and some of the timber known by this name is valuable for ties, while some varieties are worthless. Of the latter varieties, that growing in swamps is the most worthless. Most black ash grows in low ground, in what are known as "black ash swales." These swales are low, narrow strips of ground that in times of much water in swamps serve as water courses, but are dry most of the year, except in spring and fall. Ash growing in swales and on the borders of higher ground is usually good for ties and fencing timber, but that growing in swamps or where the ground is constantly wet is mostly rotten at the heart and is worthless for any purpose. Much of this heart-rotten ash finds its way into railroad tracks, where it lasts from one to three years, and is then taken out. Any ash that is light-colored and sound at the heart is excellent for ties, but that of a brownish or "water-melon" color is worthless. Of this timber one variety is known as gray ash, another key ash, others bastard ash, blue ash and white ash. These varieties grow on dry land; the bark is thin and the timber close-grained and tough. The sap of those varieties is of an oily

nature, and it will burn when green equal to the seasoned resinous woods. Green ash is good kindling-wood, by reason of its oily nature. If cut in the spring and summer months, sound ash of any of the varieties makes excellent ties, but the soft-hearted, dark-colored swamp ash should always be discarded for any use. For fence rails the ash is excellent.

Red Elm.—Although elm is generally known as a timber that rots quickly, what is known as red or slippery elm is one of the most durable of woods, and is suitable for ties and many other purposes. Most of the elms grow in soft, swampy ground, and the pores, which are large, are filled with a sour, disagreeable fluid with an odor similar to the red or black oak, and it is this sap or fluid that causes the rapid decay of the elm. The red elm, however, is a distinct variety, growing on higher ground, is free from the destructive fluids common to short-lived timbers, is firm and close-grained, impervious to moisture, is durable in any place it may be put, and is very desirable for ties and fence posts at any price within reason.

Red Beech.—This tree grows on what are termed beech ridges, and is usually of a thrifty and dense growth. The trunks are tall and straight, with a smooth, lead-colored bark. The heart or red portion of this wood was never known to decay. The sills of the first frame buildings erected in Northern New York and the northern portions of New England made of red beech are yet sound and as hard as horn. Carpenters, in repairing old buildings, complain that they can neither draw a nail out of, nor drive one into, this old red beech without much trouble and waste of nails. The worst feature of this timber is, that the sap wood is thick, and is not durable when exposed to moisture. When the sap wood is removed, there is scarcely any limit to the life of the red beech.

The White Beech is usually found growing among the red variety, and is exceedingly hard and one of the heaviest woods growing on this continent, and for railway uses the most worthless, except it be for fuel. The white beech is white to the heart, and the second growth is almost like lead; it is extensively used for plane stocks and other carpenters and mechanics' tools, but exposed to earth or moisture it is one of the most perishable of woods. The red beech is valuable for ties and fuel and the various building purposes.

Yellow Locust.—This is considered by many engineers as the best timber for ties growing in America. Like some of the last-mentioned woods, it does not grow in sufficient quantities for extensive use, but some railroad companies are giving their attention to raising locust for ties, and it is believed that this timber may be grown with profit for ties and fence posts.*

Catalpa.—Mr. E. J. Barney, of the firm of Barney & Smith, the extensive car manufacturers, of Dayton, Ohio, who has given much time to the study of American timber, and especially to the catalpa, regards this as the most valuable timber growing on this continent for railroad purposes. It is the opinion of Mr. Barney that it may be grown with profit by railroad companies and other land-holders. Among other instances of the extraordinary durability of this timber he mentions that catalpa of which a fort was built was sound at the end of one hundred years. As timber is fast getting scarce, it would seem advisable for railroad owners to investigate the matter of growing this and other valuable timber.

Soft Maple.—Generally this timber is considered worthless for ties, although it has been used on a few of our roads, notably the Canada Southern. This road runs through a tract of country heavily timbered with soft maple, much of which was laid in the track, but with what degree of satisfaction is not known at this writing. It is the opinion of the writer, however, founded on experience with that timber, that it will hardly come up to the expectations of the engineers who constructed the road, and who had strong faith in the durability of that timber. Soft maple grows on low ground, on the margins of swamps and marshes, and on low, level tracts that are too wet for cultivation without thorough drainage. The wood is white, and when green is very soft, but when thoroughly seasoned it is exceedingly hard, so hard that spikers operating on "soft maple" regard it as a misnomer. Timber should not always be selected for ties on account of its weight, hardness or solidity, as some of our hardest woods are the most perishable when partly embedded in the earth or "between wind and earth." The sap of the soft maple stains the tools used in cutting the timber to a lightish black color. The bark is used as a domestic dye, and in Vice-President Wheeler's school-teaching days, was used for writing-ink. Notwithstanding the remarkable hardness of this variety of maple when seasoned, it rapidly absorbs moisture when exposed, and fermentation and rot begin at once. None of the many varieties of maple are suitable for ties.

The foregoing is not an exhaustive treatise on the subject, nor was it intended as such, but it embraces all the varieties of timber used or likely to be used for ties in this country, except some of the red woods of the Pacific slope, and perhaps some of the timber growing in the extreme Southern states. It was intended, however, to give a comparative statement of the relative value of the different kinds of timber. But it will be plain, on a little reflection, that the present knowledge on the subject is not sufficient to warrant such an undertaking. The vast extent of our country, with its great variety of timber and variable climate, renders it exceedingly difficult, if not impossible, for any single individual to prepare a statement of the relative value of timber for ties that would be accepted as reliable. It would require a lifetime devoted to study, research and experiment to

* The borer destroys this tree completely in most parts of this country, but it still thrives on Long Island.—Editor.

enable one to even approximate accuracy in such a statement that would cover all localities.

EFFECT OF LOCAL CONDITIONS.

It is a well ascertained fact that any kind of timber will remain sound in some localities longer than in others under the same treatment. It is also a fact that timber cut at a certain time of the year is more durable than that cut at another time. Again, the particular soil and conditions under which timber grows have much to do with its durability, thus: a tree grown on high ground, exposed to sun-light and air, will last much longer than one of the same kind grown on wet land and in the shade of a dense forest. It is these facts that lead to so great a diversity of opinion as is usually expressed in discussions on the subject. Some one has used ties under all the above named circumstances, and perhaps others not named, all of which combined produce rapid decay, and he puts the life of that timber at three years. Another man uses the same kind of timber (or that known by the same name but perhaps a different variety), but which has had the advantages of all circumstances favorable to durability, and he places the life of the timber at 10 or 12 years. This is not supposition but the substance of statements that have actually been made on more than one occasion when the matter was under discussion. This seems like a remarkable difference of opinion (or, perhaps, more properly of facts, for, doubtless, both statements were founded on facts), but there is a far wider difference in the statements of English engineers, who have given the matter of the life of ties much earnest attention. Their reports on the durability of timber, both in its natural state and treated with preservatives, vary wonderfully. Indeed, so great is the discrepancy that were it not for the reputation of the gentlemen making the reports one would regard them as statements made at random. In view of these facts the scope of the present article will only be extended far enough to cover known facts which may serve as an aid to economy in the selection and purchase of ties. It may be well to state, however, that an engineer as road-master should in making his selections study the peculiarities of the timber, ballast, traffic and climate of the locality where the timber grows and where it is to be used. Another matter that should be taken into account is (as Mr. Kirkman says) transportation. To illustrate: the Detroit, Milwaukee & Grand Haven road runs across the state of Michigan a distance of 285 miles; its eastern half runs through an oak-timbered region where first-class oak ties may readily be delivered on the road. The western part of the road is convenient to hemlock timber, and hemlock ties are purchased at a trifling less cost than oak and shipped to the eastern end of the road. These hemlock ties are laid mixed with a few of white oak, which are delivered in small lots on the track. From this it would seem that hemlock ties are here regarded as durable as oak, and that they pay transportation. Others might think differently and use the oak and save transportation.

TREATMENT OF TIES.

Another matter connected with the durability of ties is removing the bark and sap wood. It is a serious hindrance to track repairs when, in tamping, the bark becomes loose from the ties, and it would pay to remove the bark before putting them in the track on this account alone; but there are many who believe that the removal of the bark will add some years to the life of the tie. This is probably true in cases where the tie lies above ground, as on unballasted or lightly ballasted roads; but where the tie is covered with a gravel or sand ballast, the sap wood does not appear to hasten decay. On the contrary, there are those who believe that the sap wood serves as a protection to the body of the tie by reason of its retaining moisture and preventing the changes of temperature and degree of moisture necessary to rapid decay. As previously stated, it is a troublesome and somewhat expensive operation to remove the bark from ties that were cut when the bark was firmly set to the wood. Doubtless the best plan is to cut the timber when the bark will peel and let the sap wood remain, unless in case of the unballasted track; in that case remove the sap wood.

Split Ties.—On many of the Western roads, where tie timber grows to an enormous size, a great many split ties are used. That this should be practiced when portable saw mills are so plenty and easily procured is something to be wondered at. It is utterly impossible to keep a track in anything like working condition on these substitutes for ties. Probably if a tie were split from a log and properly hewed, with sides and edges parallel and perpendicular or at right angles, it would be a "tolerable" tie, but as they are usually made they are a nuisance. The cross-sections of these ties are of all the forms of the triangle—are rhomboidal, trapezoidal and of every conceivable form but rectangular. And besides they are twisted and winding, so that there is no plane surface for a bearing for the rail. At least one rail must rest on a corner of the "stick," which gives it a tendency to roll over. They cannot be properly spiked, nor can they be tamped so as to keep the rail in surface. They will not stay in their places, but shift from a perpendicular to a diagonal position by the motion of the rail under passing trains. Don't use split ties.

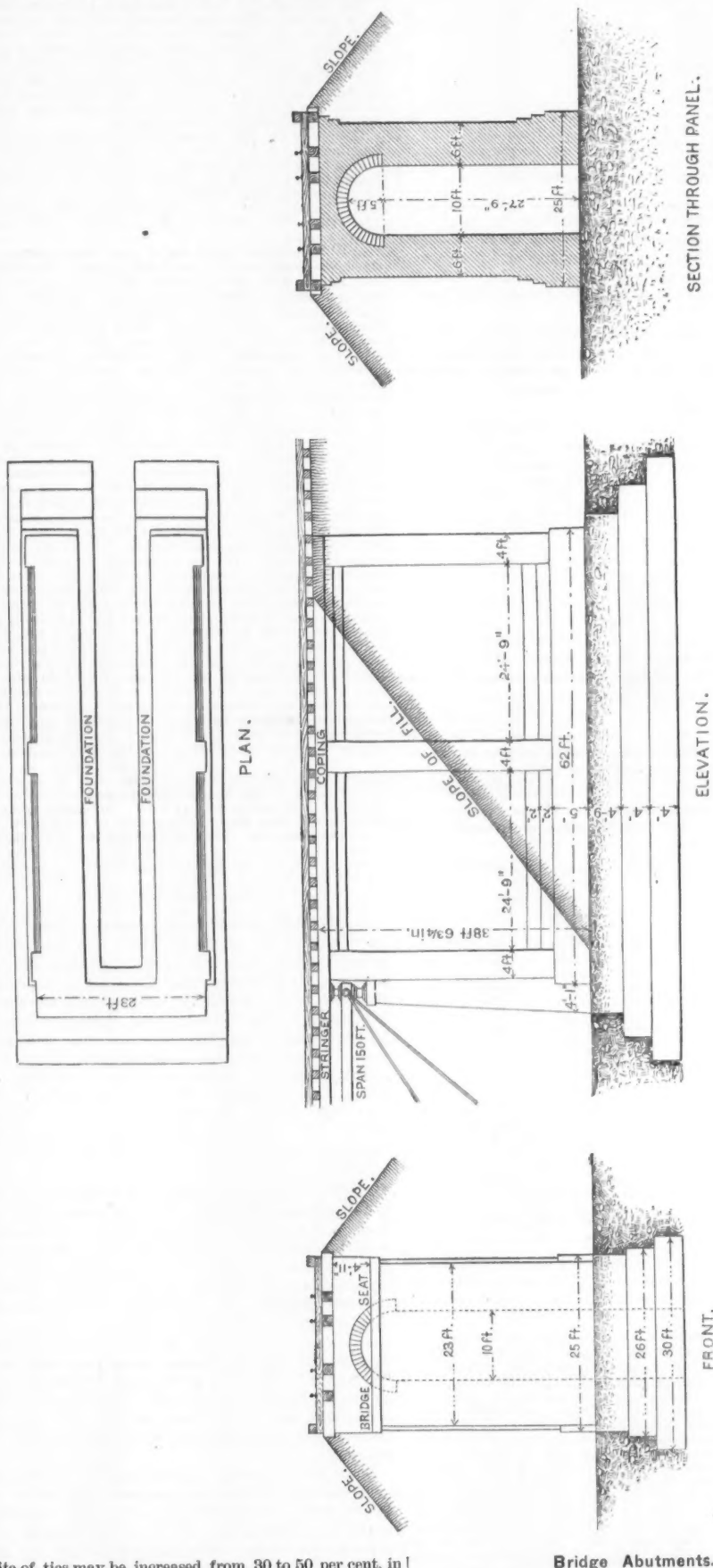
COVERING TIES WITH BALLAST.

Another matter in this connection, and one of sufficient importance to engage the attention of engineers and road-masters, is the devising of some plan by which ties may be entirely covered with ballast for the purpose of prolonging the life of the ties and also to give a greater stability to the track. The main difficulty in covering the entire tie so as to protect it from sun, wind and water has been that it interfered with track repairs, and it also served as a partial check to good drainage. It also interferes with the

thorough clearing of snow and ice, for to cover the ties to a depth sufficient to protect them the base of the rail and the spikeheads must be covered. It is here suggested that a remedy may be found for this difficulty by placing a cast-iron saddle or chair on each tie to raise the rail 2 or 2½ in. from the surface of the tie. This would allow of the tie being covered to a sufficient depth to prevent decay and not interfere with drainage or track repairs. It is believed that

of our using iron and glass as substitutes for wood for ties, as is being done abroad, and it remains for us to make the best possible use of our timber for ties and other purposes. It is to this end that the foregoing has been written, and although all who may read the views herein expressed may not agree with them, yet it is the belief of the writer that a careful perusal will result in some degree of profit.

WM. S. HUNTINGTON.



Bridge Abutments.

The design herewith presented is the abutment of a two-track railroad bridge supporting an iron truss of 150 feet span. It was designed and built about ten years ago by S. T. Fuller, Chief Engineer of the Philadelphia, Wilmington & Baltimore Railroad, the form being suggested by the late B. H. Latrobe, Consulting Engineer. Its merits are novelty, economy and strength; economical, as it takes less material than the usual forms, is substantially protected inside and out with the earth, and the pressure of the embankment is in the direction of its greatest strength. The engravings are so plain that further description is unnecessary.

—Mr. B. S. Fitch has resigned his position as General Freight Agent of the Chesapeake & Ohio Railroad, in order to take charge, as Managing Engineer, of the Pelican mine in Colorado.

the life of ties may be increased from 30 to 50 per cent. in this way, and that the expense of track repairs other than renewal of ties may be reduced at least from 25 to 40 per cent. Some might object to the interposing of cast-iron between the rail and tie on account of destroying the elasticity necessary to the long life of railroad rolling-stock, but it is believed that in practice this would not amount to an objection. The rails could be kept in perfect line and in better surface with far less labor when so covered, and the disturbance by frost would be much less than when a portion of the tie remains above the surface of the ballast or road-bed. The attention of engineers and road-masters is earnestly called to the importance of this matter, and it is believed to be well worthy of a practical test. A mile or so could be laid in the manner indicated with but a trifling expense. Will some one give it a trial?

The nature of our soil and climate precludes the possibility

Designed by S. T. Fuller, Chief Engineer Philadelphia, Wilmington & Baltimore Railroad.

The Belgian Cable System on the Erie Canal.

An incorporated company, with a large capital, has authority, through an act of the Legislature of this state, to put the Belgian towing system into operation in the Erie Canal from Buffalo to Albany, with the understanding that it is not to interfere with the regular navigation of the canal. The company is laying its cable in the bed of the canal, and will extend it throughout as soon as practicable. The headquarters of the company is at No. 73 State street, Buffalo. M. M. Caleb, of that city, an old canal man, is General Superintendent. William Shepard, a practical ship builder, engineer and inventor, is Superintendent of the division between Utica and Rochester, and Charles Conley, of Syracuse, a veteran practical canal towing man, is agent for the company on that section. The unwavering labor, faithful devotion to the company's interests, and general practical intelligence of these men, have won for the system all the success that it has had on the middle division.

So much has been said of late by men deeply interested in the canals and boatmen in favor of and against the Belgian system of towing by cable, that a representative of the *Herald* was sent to Syracuse yesterday, to make a trip with one of the tows and learn the operation of the system in detail.

Few people have any idea of the plan of operation of this system. As a wire cable $\frac{3}{4}$ in. in diameter and about 60 miles in length, has been laid on the bottom of the canal between Syracuse and Utica, the best explanation in detail that can be given is this: Suppose that the two ends of the cable are fastened permanently at Utica and Syracuse, and a man in a small boat wishes to come to Utica, and draw four, six or eight small boats behind him. He simply sits in his boat and pulls on the cable in an opposite direction from Utica, the operation would naturally force the boat east, and its continuance would eventually bring the first boat, its occupant and the boats connected with it into Utica, while a cable remained in its place in the bottom of the canal, hugging the tow-path bank at bends in that path and the heel-path bank when the bends are in that direction. The occupants of the boats attached in the rear, not taking hold of the cable, must do their share of work by steering so as to keep the line from swinging like a whip-lash, from one side of the canal to the other.

Or, like the old-fashioned rope ferries on the Mohawk, the boatman grasps the rope for a leverage, while with his feet and limbs he forces the boat from one bank to the other.

In the Belgian cable towing system, the steam tug takes the place of the small boat, its "clip wheel," which grasps the cable and pulls, represents his fingers, hands and arms, the powerful engine and boiler supply the muscle, and the string of six or eight canal boats connected in line by hawsers represent the small boats behind the first skiff. If these boats are not steered as they should be, they are liable to knock against boats bound in an opposite direction—especially in low water—knock against the tow-path and heel-path masonry and meet with pretty much the same fate that befalls the boys on the outer end of a game called "snap the whip."

The charter to the towing company was granted in 1873 or thereabouts. It has been in operation from Buffalo eastward as an experiment for five or six years. This summer the company is towing from Buffalo to Rochester, about 93 miles, and to date it has handled about 5,000 tons.

The Cable Company purchased the Fulton Towing Company's interest, live stock and real estate at 31 stations, 10 miles apart, including at least 600 horses and mules. This gave the company the exclusive towing on the canal (excepting that done by individual boat-owners with their own horses and steamers) by steam and animal power. The rate for towing by the season is 20 cents per mile for light and heavy boats, or 25 cents per mile for horse boat for single trips. In contracting for towing with boat-owners or captains the Cable Company takes their horses and mules and pays for them in towing. These animals are used on levels where the cable is not laid and to assist tows through locks through which the cable and cable tugs do not pass. On account of the number of comparatively short levels between Syracuse and Rochester—ranging as they do from one mile to 17 in length—no cable has yet been laid in that division and towing is done by horses. This season the cable may be laid from Rochester to Clyde.

Superintendent Shepard commenced laying the cable from Syracuse to Utica about July 18, and put it down quicker than cable was ever laid before. It was paid out of the hold of a canal boat that was drawn by a steam tug. At present towing by cable on the 60-mile level is only done between Syracuse and New London, but the cable boats will soon push on to Utica.

The cause of delay is the rascally work done by Haigh, of Brooklyn bridge wire notoriety (now in prison for swindling), who sent cable to this level which was full of rotten splices—all of which pulled out and had to be respliced by Superintendent Shepard and his sons. Only for this bad work the cable system would be perfect to Utica.

The cable is $\frac{3}{4}$ in. in diameter, made of Bessemer steel wire, in six strands of seven wires each. Thirty miles cost \$18,000 and that quantity weighed 80 tons.

The company now has twelve cable tug-boats at work and six new ones. These boats cost about \$5,000 each. The engine is a high-pressure, cog-gear propeller, 14 x 20 cylinder, eight times geared, about 80-horse power, with locomotive boiler. The length of the tug-boats is 75 ft.

Connected with one end of the main shaft of the engine, like the shaft of a side-wheel steamer, but three feet clear of the water, on one side is the clip-wheel of iron, 16 ft. in circumference and 5 ft. in diameter; around the outer circumference of this wheel are 108 clips over which the cable passes. A pair of clips is two pieces of iron about two inches in width and four in depth, each pair working upon one bolt or shaft and hollowed out just above the fulcrum or shaft so as to admit the $\frac{3}{4}$ -in. cable. When open the clips resemble the hollow in a man's hand between his thumb and forefinger; when the engine revolves the clip-wheel about 20 of the 108 clips grip the cable tightly, the tighter the cable the more tightly is the grip, and as the wheel revolves the tug and the boats towed are pulled forward. The cable passes first from the bottom of the canal over an underground pulley-wheel, then around one grooved tightening wheel about four feet in diameter, thence over the top of the clip wheel and down and out under the other tightening wheel and over the rear pulley wheel. The cable touches the bottom of the canal by its own weight about 150 ft. each side of the boat. The boats draw five feet of water, have a keel, and are iron sheathed. The clip-wheel side is indented to allow the wheels to reverse within the boat's outer line and to protect the wheels from side collisions. The tugs carry six men or double crews of captains, engineers and tillermen, averaging \$1.25 per day. Each boat has a propeller wheel to be used when disconnected with the cable, but is not used in towing. The boats are double headers, with rudders fore and aft, both of which are operated by a wheel located in the centre of the boat and engine room. The consumption of coal in each 24 hours of towing is one ton. On the 60-mile level at present there are five boats, four towing and one aiding in repairs, tightening cable. When in regular working order there will be one boat on about every 10 miles of cable—

each running backward and forward until it meets its companion boat. The average expense of each boat per day, when towing, will be from \$16 to \$18. The company pays the captain \$3.50 per week for boarding the men, furnishes coal, oil, wood, soap and matches, and the captain employs the cook.

Each cable tug-boat can tow from one to eight boats at a trip, at an average rate of from two to three miles per hour, and with a clear, straight canal and full channels could tow light boats four miles per hour. The boat immediately behind the tug is attached by a 300-ft. hawser, and the others from 150 to 200 ft. apart, in one line. The intention of the company is to take two or more boats in tow as fast as they apply, unless more are ready, and thus keep them moving along the route. The cable boat from the Lodi lock, two miles east of Syracuse, will tow east eight or ten miles until it meets another cable boat coming west with a tow or without one. As the cable boats cannot pass each other when the cable is attached, the hawser of the western tow is transferred to cable boat No. 2, and No. 2's tow hawser to cable boat No. 1, and each returns over its route, No. 1 to the Lodi lock and No. 2 until it meets No. 3 east, and exchanges tows as in the first instance.

At each end of the cable is a gearing called the "jack" which holds them, and by it the cable can be made tight or loose.

At 10:25 a. m. yesterday the *Herald's* representative took passage on cable boat No. 7 at the Lodi lock. Two boats, one a laker, the McDonald, loaded heavily with ashes, and a lumber boat came along for a tow, and cable boat No. 7 took hold of them promptly. The cable was tight and the clip wheel took hold of it with a will, the clips rarely, if ever, slipping. Capt. James Shepard, son of the Superintendent, was in command, with Albert Desmond as engineer and James Caverly as steersman. The water in the level was fully eight inches lower than it should have been, indicating neglect at the feeders. Horse boats dragged on and turned up the mud on the bottom, and made towing of all kinds very difficult and troublesome, especially in passing loaded boats in narrow points on the canal. In the first hour the tow made $2\frac{1}{2}$ miles nicely, passing one horse boat within a mile of the point where it was first seen. In straight portions of the canal and going around heel-path bends, the cable boats keep the heel-path portion of the channel and out of the way of horse boats, which pass on the tow-path side without trouble. In what are called "tow-path bends," the cable in seeking the nearest point to a straight line, hugs the tow-path, and the cable boats must necessarily take the tow-path side. The lines of horse boats bound west are disconnected, passed over the cable boat as the horse boat passes outside, the cable boat slackens up, and the horse boat crosses over the cable and hawser and to the tow-path side of the canal in front of the first boat towed, and then the cable boat pulls out again. On the side opposite many of the tow-path bends is what is called wide water, sections of the old and new canals combined, and varying from 100 to 500 ft. in width. Where there is wide water, the cable company is driving piles far beyond the channel used by up or down horse boats, and the cable passes around the side of the piles opposite from the tow-path bend. This keeps the cable boat away from the tow-path, and allows horse boats to pass free on the inside. When no piles are used the cable boat, with its iron sheathing, crowds or creeps snugly against the tow-path bank, and makes progress comparatively slow. In passing horse boats going in the same direction (say east) at tow-path bends, if the horse boats will keep on the outside or middle of the channel, the cable boats will pass them without trouble. In narrow points on the canal with low water, the cable boat and tow moving faster than the horse boats, there is danger of the bows of the tows running into the sterns of the boats being passed—unless the speed of the tug is slackened, or—what is virtually necessary—good steering is done.

As these collisions are the principal topic of complaint on the part of the boatmen who protest against the Belgian cable system, the subject of steering boats deserves particular attention. A few boat captains appreciate the fact that it is as necessary to have a good steersman as it is to be towed, employ experienced men, and in the end save money by this course. Others put boys, tramps and women upon the tiller, and then there are lively times at both ends of boats. If such steersmen are attached to steam tows—whether cable or the independent steamer or tug system, collisions and cussings can not be avoided. In open water most any one can steer, but within the narrow limits of the canal, with low water reducing the size of the navigable channel and the suction of passing boats to be contended with, the man at the tiller should know his business. Bad steering by the men on boats being towed has caused nearly all of the damage done thus far by the cable system—the cable boats not having damaged a dollar's worth. Superintendent Shepard gives strict orders to his cable crews to use the utmost caution in passing boats, give horse boats every possible chance, and if one happens to be put aground, to stop and pull them off. This course has won over many of the opponents of the system, and if continued, as it probably will be, ere long complaints will be few and far between. The writer accompanied the state officials and committee of experts when they tested the Baxter steamers when competing for the legislative prize several years ago. The appearance of a steamer was the signal for complaints and profanity upon the part of many foolish and thoughtless boatmen who seemed provoked when they were passed. Others seemed to take a deep interest in the experiment and wished the party success. Now the Baxter and other steamers, single and "double-headers" pass along the canals quietly and not a word is heard about them.

Superintendent Shepard has an improvement in cable boats which permits at least 60 ft. of slack cable to be carried in the boats—the cable being kept tightly on the clips all the time, which is absolutely necessary. The apparatus is so arranged that when tow-path bends are reached, a portion of the slack can be let out so as to clear the bank and take the outside of passing boats. The cable boats made thus far are more useful than ornamental. They are built very strong, indeed. The Shepard improvement will be tried on some of the new boats. Men who are operating the boats every day will be able to suggest improvements for next season which will add materially to the perfection and efficiency of the system.

Another improvement suggested by Superintendent Shepard is the attaching of a portable wheel steering apparatus to two boats in tow. They are attached closely together. The wheel on the stern of the forward boat is attached by tiller ropes or chains to both sides of the rear one. Throwing the wheel to the right or left will swing the rear boat around like a rudder blade or bent like the tail of a fish. Such an arrangement could turn the rear boat to an angle of almost 45°, giving it immense steering purchase.

The direct mechanical advantage of the Belgian cable towing plan is to give the tug a substantial moving power, instead of the imperfect and yielding resistance of water against the power of a propeller or paddle wheel.

Among the other advantages claimed are the following: A saving of 25 per cent. over individual horse towing. Better time—boats being able to make at least two additional trips per season.

A saving of \$44 on every six boats every 24 miles over the

Baxter or other independent steamer towing—by reducing the number of engineers, consumption of coal, etc., avoiding the terrible cruelties from which canal horses suffer, the demoralization of boy drivers, etc.

Improved and more speedy trips with cargoes to tide-water, giving the state of New York the full benefit of the great canal, and protecting the diversion of money, freights, etc., by southern railroads and by Canada, via the enlarged Welland Canal, which may otherwise rob the state of its just dues. Nearly every boat passing through the Erie Canal leaves from \$250 to \$300 in the state, while freights by the Welland Canal leave us nothing.

A boat captain passing the cable boat, yesterday, expressed the opinion that if the horse towing was abolished and the canal was given over to the Cable Towing Company, it could not pretend to do the work, even with two cables.

Superintendent Shepard asserts that this could easily be done. There are about 3,500 boats on the canal, steamers included. If the cable company had clear channels and two cables, it would put one boat to every eight miles, which would require but 43 boats, each of which could tow eight boats easily, the cables being kept apart by piles driven in the centre of the canal. With no horse boats to bother, the cable boats could make trips fully one-third faster than at present.

The trip from Lodi locks to Manlius Center, seven miles, was made in three hours and 45 minutes. This section of the canal is acknowledged to be the hardest towing on the level. It includes the most tow-path bends on the canal, narrow channels at feeders and other obstructions. In this trip of seven miles the cable tow passed one horse boat that left the lock four hours ahead and four others far apart which could not be seen, one beyond the other.

The Belgian cable towing system is still in its infancy, and naturally meets with opposition and denunciations like those showered upon the locomotive railroad, steam navigation, the electric telegraph and other inventions, now indispensable. The system has its defects, but they can and must be remedied. The great capabilities of canal transportation must be made available and utilized to their fullest extent, so as to make it a source of revenue to the state. The complaints of the boatmen will be heard, and the points of complaint will be investigated by competent state officials and experts. Some, if not all, the evils may be remedied if not entirely removed, and in the end a perfect, popular and trustworthy system of towing may be the result. The Belgian Cable Towing Company has an abundant capital and large powers conferred upon it by the state. If it does not avail itself of all these advantages to make its system what is needed, where will the long hoped-for improvements be found?—*Utica Herald*, Aug. 17.

The Massacre at May's Landing—An Engineer's Confession.

At the inquest at Camden, N. J., yesterday, in regard to the recent railroad smash-up at May's Landing all eyes were turned upon the swarthy-complexioned, little, slender-built man who, in response to the Coroner's summons, arose from his seat near the doorway going into the grand jury room and advanced to the desk to take the oath. This man was Edwin T. Aitken, the engineer of the second section, about whom the most unfavorable comments had been made by the wounded and their friends since the night of the accident. Upon seating himself in the witness chair Aitken nervously drew his hand across his eyes to dash away the tears that would now and then trickle down his face, despite all efforts to keep them back. It was a sad tale that he had to tell. He told about his leaving Atlantic City at 6:05, five minutes later than the first section.

"I had no trouble on the way down in the morning," said he. "The air was applied before I left the Excursion House, and on my return the only time I had occasion to use my air was when I was nearing May's Landing, and there, unfortunately, I found it didn't work. I was due at May's Landing at 6:40. I got there at 6:40 $\frac{1}{2}$ or 6:41."

"How was it you did not get there at 6:40?" asked the Coroner. Looking up from the floor, where he had kept his eyes since he began his story, he quietly answered: "It was through a little miscalculation."

"Now tell us how it was your engine became unmanageable," gently interposed his questioner.

"Well," said Aitken, "when at the top of the hill I was going about twenty-five miles an hour. I put the air-brake on before I got to the curve, but it did no good."

"How was that?"

"I don't know; all the checking that was done I did with the driver-brakes on the engine."

"What brakes were you using?"

"The automatic."

"Where can they be tampered with?"

"Under the cars and in the closets."

"Did you say anything to your fireman about your inability to stop?"

"I never said a word until I hollered 'Jump, for God's sake, Sam.'"

"Have you ever fired for Cassidy?"

"I have now and then for a day or two at a time."

"Is there any rivalry between you and Cassidy?"

"No, sir; not in the least."

"Are you in the habit of drinking?"

"That's a thing I never do, thank God. They can't lay that on my shoulders." Here the witness burst out crying afresh.

George L. Britton here begged leave to ask a few questions. Permission was accordingly granted, when he inquired:

"What brakes have you been accustomed to using?"

"The Westinghouse."

"What brakes did you use that day?"

"The automatic."

"How long did you use them previous to that day?"

"I never used them before that day."

"Were you perfectly acquainted with their mode of working?"

"The engineer here put his hand to his forehead and instantly blurted out:

"No, I was not. That's the first day I ever used them, and I didn't apply them properly. I ascertained a few days afterward from a competent engineer on the Pennsylvania Railroad that I should have kept turning the lever to pump air in the cylinders, whereas I only gave it one turn, as I thought that was sufficient. The automatic is more intricate than the Westinghouse, and I thought all I had to do was to use the former just the reverse of the latter."

"What instructions did you ever get regarding their usage?"

"The only time I was ever told how to use them was a few minutes before I left the depot yard that morning. I ran up to Dan Cassidy, who was on the first section, and asked how I should work them. His only reply was 'Ed, use them the reverse of the Westinghouse.'"

"So, that's all the instructions you ever received?"

"Yes, sir; that's all."

These admissions by Aitken seemed to make a deep impression upon all present.—*Philadelphia Times*, Aug. 17.



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EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN OPINIONS, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

THE ROAD-MASTERS' CONVENTION.

The announcement of the annual meeting of the Road-Masters' Association, which is to be held in Chicago Sept. 8, was published in our issue of July 23. At the same time a list of thirty-six subjects was also published. From these the Committee on Discussion has selected a much smaller number for discussion by the convention, the list of which we publish this week. The bill of fare is an inviting one, and it may be said here, incidentally, that it is surprising that the topics presented have never received more consideration than they have. The expenditure, in the maintenance of roadway, may be stated roughly at one-third the total cost of operating a road. Notwithstanding this fact, there has not been, until quite recently, any organization of those in charge of this very important department of railroad operation. It may then be reasonably expected that the association of road-masters has a fertile field open for it, and that very great advantage will result from their coming together, and from the joint discussion of the questions in which they and their employers are, or should be, so much interested.

On the general subject of conventions, and their methods of doing their work, much might be written. One thing, however, is apparent, which is, that the soil of conventions—to use an agricultural simile—soon becomes exhausted, unless it is fertilized by reading and study and the acquisition of knowledge by other means than mere personal observation and experience. Generally, new associations of this kind yield very fair

by the way, which it is short-sighted policy for superior officers on railroads to be too chary of.

The fact that the success of meetings of this kind is to so large an extent dependent upon the methods adopted for conducting their proceedings will be reason enough for giving them some consideration in this connection. These methods must to a very great extent be adapted to the material of which the membership of an association is composed. Thus, in the Society of Civil Engineers, the members of which generally have had the advantage of a liberal or fair amount of education, the proceedings usually consist of papers on various subjects written and contributed to the Society for discussion. To be able to prepare a paper of this nature, the author must have a kind and degree of training which is very far from being general among the members of associations composed of master mechanics or road-masters, and therefore if the interest of a convention of this class of men were dependent upon such contributions, it would probably be a dismal failure. Take the first of the questions or subjects in the first list reported for consideration by the road-masters: "Comparative action of frost on different materials composing road-bed, and best mode of obviating heaving." If any one should select a dozen road-masters who fairly represent their class, and ask them to write a paper and tell "what they know" about the effects of frost and heaving, probably each one of them, or a large majority, would much rather lay ten miles of track with a small gang of men than to undertake to do that kind of intellectual work. The reason would not be that such men do not know enough of the subject to make an interesting and valuable paper. Let any genial person who can secure the confidence of these men place a table between himself and two or three of them, and supply the table with proper viands, so as to banish reserve, and then let the former ask a series of questions such as: What do you mean by heaving? What is its cause? Where does it generally occur, in cuts or on embankments? Does stone ballast prevent it? On what kind of soil is it most common? To what extent is it due to bad drainage? Have you ever tried underground or tile drains to prevent it, and with what success? How is the wear of rails affected by it? What influence has it on the joints and spikes? When it occurs does it add much to the expense of maintenance of track?

These, amplified and supplemented by others suggested by the replies and which any ready person might ask, he would find would be certain to evoke an amount of information which if written out fully and clearly would probably astonish those who contributed it, and would be a bonanza to the editor of the technical department of a railroad newspaper who found himself a day or two before going to press with neither subject nor ideas for editorial comment—an occurrence, by the way, which is much more common perhaps than the readers of the paper sometimes suspect.

There is no class of men who have as much knowledge, or should have as much, about the effects of frost and heaving of track and of the other subjects proposed, as track-masters, and therefore the difficulty in making such a meeting as the one to be held in Chicago interesting is not because the members present will not come with an adequate supply of knowledge, but it will be because it cannot be drawn out of them. The eighth topic of the list referred to is simply "spikes." It is not difficult to imagine the versatile and genial chairman of the Road-Masters' Association, when the body over which he will preside has discussed the preceding subject, announcing that, having disposed of severally the eighth topic is in order, "Now, gentlemen, what do you know about spikes." It may be imagined that it would not be easy for any one, however familiar with the subject and with public debate, to get up under such circumstances and grow either eloquent, entertaining or instructive on the subject named; and yet there can be no doubt that nearly every member present would have some piece or scrap of information, knowledge or experience which would be of value if it could be called out. The great difficulty in conducting these meetings is in doing this. The Road-Masters' Association is in this respect fortunate in having a chairman who has the capacity of drawing out those over whom he presides, which is an extremely difficult task, considering their diffidence, and the fact that they are not accustomed to speaking to a public audience, and is a very serious obstacle in the way of making such meetings as useful as they might be. The less formality there is in the methods of conducting the business the better. The mere external surroundings and arrangements for such meetings have much to do with their success. A large room with the audience scattered over it is almost certain to suppress discussion. A small room

in which all the members must be near each other has the effect of making them feel at their ease.

It has sometimes seemed as though it would be a good plan if associations of this kind should authorize its officers to act in the capacity of a sort of investigating committee—that is, when a subject is up for consideration let those members who probably have the most information concerning it be called up and be questioned as a witness is in court. Of course the liberty to answer or not would be reserved by the member questioned. This plan would undoubtedly be effective in calling out a great deal of valuable information which by any of the present plans is never touched. In other similar associations the plan of appointing committees, who issue questions in circular form, has been in use ever since their organization. The practical difficulty is that these circulars are answered by only a very small proportion of the members. There is no apparent reason why a committee of this kind might not assume the functions of a committee of investigation, and invite members to appear before them to give their testimony during the session of the convention. One great advantage of this would be that those questioned would learn the limits of their knowledge, and the importance of inquiry in certain directions. In fact, one of the most useful results that follow meetings of this kind is that discussion and inquiry indicate to those present the direction in which their knowledge is deficient. A question asked, to which a person can give no satisfactory answer, is a perpetual incentive to seek information, the stimulus of which does not become inoperative by the adjournment of the meeting at which it was asked.

Of the topics to be taken up, and in which all road-masters are interested, little perhaps need now be said. Comment after the meeting will be more to the purpose than before. There is good reason for thinking that the meeting will be a very successful one, and both the road-masters and their employers will doubtless find it to their interest to have the former present at their convention.

THE NEW CHICAGO APPORTIONMENT.

The Board of Arbitration has just concluded perhaps the most important matter that has yet been submitted to it, that is, the re-apportionment of the eastward shipments from Chicago—the largest railroad traffic of what we may call one kind in this country, or, perhaps, in the world. How large it is may be judged by the fact that in eight days less than one year, namely, down to the first of June last, the shipments (exclusive of live stock) amounted to 2,134,554 tons—an average of nearly 7,000 tons for every working day. But even its greatness does not measure its importance, for it is a rapidly growing traffic as well—growing faster than that of any other great city in the country. Figures showing the railroad shipments for three calendar years, compared with those of this year, ending with June last, will show this. They are:

1875.....	1,147,374 tons.
1876.....	1,798,771 "
1877.....	1,251,242 "
June 9, 1879, to May 31, 1880.....	2,134,554 "

The shipments of 1879-80, therefore, were 90 per cent. greater than those of 1875, nearly 20 per cent. greater than those of 1876 (when the railroads by their low rates took away a large part of the legitimate lake business), and 72 per cent. more than those of 1877.

The shipments in 1878 we are not able to give. In all cases these shipments include only such as are divided under the direction of the Joint Executive Committee, that is, to the western termini of the trunk lines or points further east, which is, however, by far the larger part of the eastward shipments. Now one per cent. of this last year's business, through to New York, at 30 cents per 100 lbs., which is the lowest rate of this year, yields \$128,000, and is equal to more than 3 per cent. of the St. Louis shipments; to nearly 4 per cent. of the Cincinnati shipments, etc. Consequently the railroads are especially anxious to increase their proportion of the Chicago shipments. It was long before they could be got to agree to submit the division there to arbitration, and yet no division of east-bound freight could have any value with Chicago left out. When one was made, however, the company that considered itself worst treated made a great deal more from its Chicago traffic than it had done before for many years, if ever. But the entrance of a new competitor upsets the best made arrangement. It must have a share, and the questions how large that share shall be, and from what other lines it shall be taken are sure to be hotly contested. Indeed, heretofore the entrance of a new railroad line has almost always been the signal for a railroad war, frequently for one of long duration.

crops for a number of years, after which their success depends upon how much phosphorus is added to the soil they cultivate. As only a few crops have been taken from the Road-masters' Association, there is good reason to expect that the meeting in Chicago will be a very interesting one, and that road-masters generally will find it to their advantage to attend, to say nothing of the pleasure which will accrue therefrom, an element The new company sets up that it needs to "introduce itself," and to get the old customers of the railroads to try it it reduces its rates. The extension of the Baltimore & Ohio into Chicago was the signal for what was doubtless the longest, most desperate, and to profits the most destructive railroad war ever known, in which the lines between the Mississippi and the East lost money enough to build the Baltimore & Ohio Chicago Extension over and over again. More lately we have seen how the extension of the Chicago & Alton into Kansas City broke up the Southwestern Association and required six months of desperate fighting (at the rate of 50 cents a passenger from Kansas City to St. Louis) to settle the status of the new line. The Grand Trunk's entrance into Chicago deserves to be celebrated as the first great event of that kind which did not cause a railroad war. It cannot be said, however, that this was done without resort to the old ways of "introducing" a new line. The Chicago & Grand Trunk was completed for some months before it became a member of the Joint Executive Committee, and during that time it "cultivated business" in the usual way of new-comers into an old trade. Its work was made comparatively easy for it by the fact that the old roads were combined to maintain rates, and, certainly, with very slight exceptions, did maintain rates. Consequently the Chicago & Grand Trunk did not have to offer much below the regular rate to divert shipments to itself. The usual course would have been, that last March when the regular rate was 35 and the Chicago & Grand Trunk offered 32, the other roads would have "met" that rate or "cut under," the Grand Trunk would have bid lower still, and so on, until all parties concluded that the rates were too low to pay expenses. By that time the new road might have made itself pretty well known to shippers and become able to command such part of the traffic as its position, connections, qualities, etc., deserved, at an expense perhaps of millions of dollars, most of which, however, would fall on its rivals.

The Grand Trunk early declared that when its line was completed into Chicago, it would desire to become a party to the apportionment scheme, and co-operate with the other roads to maintain rates. We know that a great deal has been published, declaring the contrary to be the case; but the public declarations of the President of the company, before its share-holders at the London meetings, made any other course impossible, even if the company's officers had desired to act independently of the Joint Executive Committee, of which there has not been the slightest indication. Very likely they were glad to be able to work the Chicago & Grand Trunk indirectly outside of the Joint Executive Committee for a time, and "build up a business" for the sake of demonstrating the capacity of their line; but the end they, as well as their rivals, desired, was a regular share of the traffic at full rates.

There has much been said as to the preliminary negotiations for the re-distribution of the Chicago business, and some who discuss the subject have received the impression that the Grand Trunk made 20 per cent. of the Chicago traffic its ultimatum. It may be well here to say that it is in matters of this kind very much as it is in suits for damages: the claimant makes sure that he does not claim too little. The Grand Trunk did ask for 20 per cent. of the Chicago traffic, and at the same meeting professed its willingness to accept 15 per cent. if that would bring about an agreement without arbitration. But really it was not a question on which five companies could be expected to agree; it was not alone how much the Grand Trunk should have, but whom its share should come out of. The Michigan Central urged that what little the Chicago & Grand Trunk could get should come out of all the other Chicago roads alike; the Lake Shore that the new road could only get what it had formerly received from the Michigan Central, so its share should come wholly from the Michigan Central; the Pennsylvania that the Chicago & Grand Trunk's business was wholly to the northern ports and New England, and should come from the Michigan Central and Lake Shore together, not at all from it; the Baltimore & Ohio could not see how a road so far north could affect it, but it took advantage of the new apportionment to ask for a larger share of the business for itself. Evidently agreement was not to be looked for here, and arbitration was the only resort.

Another strange idea has been widely spread and spoken of seriously in several important newspapers,

and that is, that if the arbitrators did not award the Grand Trunk what it wanted that company, would not accept their decision. We do not know what these journals suppose an arbitration to be. The railroads understand it to be a mode of settling a question concerning which they cannot agree by referring it to a person or persons whose decision they agree to accept before it is made: that it is a substitute for a court, deciding—not advising the decision of—contested questions. Mr. Adams, Mr. Wells and Mr. Wright do not get together and hear arguments for the purpose of advising the Grand Trunk, the Michigan Central and the rest to divide the Chicago traffic on such and such terms. The Grand Trunk, the Michigan Central and the other Chicago roads come to these three arbitrators and say: We have tried to settle these questions among ourselves and find we can't. But we have agreed to submit them to you and to accept whatever decision you may make after hearing our arguments. It ought not to be necessary to make this explanation, but readers of certain New York and Chicago papers know that it is. It is true that the Board of Arbitration cannot send the sheriff to enforce its decision, and there is no legal obstacle to the Grand Trunk's refusing to accept the decision of the arbitrators. But that is true of all the railroad pools in the country. The New York Central may claim 90 per cent. of the New York shipments to-morrow, if it chooses, and reduce rates to 10 cents a hundred the next day if its demand is not complied with, and it will not render itself liable to any penalty under the law; its contract is one to which it is bound by honor (and policy) and not by law.

By the decision of the Board of Arbitration the Chicago & Grand Trunk is awarded 6 per cent. of the live stock and 10 per cent. of the other freight out of Chicago. This, it must be remembered, is not what the Grand Trunk is to receive, but only the share of its new line across Michigan. The Grand Trunk has lately received something like 5 to 7 per cent. of the Chicago freight at Detroit from the Michigan Central. It still has one or more freight lines working over that road, and has announced its intention to continue to work in connection with the Michigan Central, which indeed is too valuable an ally to be readily abandoned. The natural effect of its having a line of its own into Chicago, however, will be to reduce the business brought to it thence by the Michigan Central. We understand that the Grand Trunk's share comes from all the other roads except the Baltimore & Ohio, but that the Pennsylvania loses least, the Lake Shore a little more, and the Michigan Central most, to make up its 10 per cent. Most of the loss, thus, comes from the two Vanderbilt roads, which are feeders, first of all, of the New York Central, and next of the Erie. Of course not all of the traffic goes through, but most of it does, and a very large proportion of these roads' traffic goes to Boston and New England, to which the rate is higher than to New York. We shall not be far out of the way, then, in calculating the earnings from the traffic at the rates from Chicago to New York. As we have said, at current rates, 1 per cent. of the Chicago traffic for the past year would earn \$128,000 gross, and the 10 per cent. awarded the Grand Trunk therefore represents \$1,280,000 of gross earnings. Besides this there is the live-stock traffic, which has been too irregular during the past year to state what loss or gain will be had by the new apportionment. Moreover, in counting the effect of the Chicago & Grand Trunk on the earnings of the other Chicago railroads, we must remember that it will take some passenger traffic from them. Through passenger traffic, however, is harder to turn from its accustomed channels than freight. The Grand Trunk never did have much to and from Chicago except excursion traffic in summer, and it will probably take some time to develop the capacity of the new line in this direction. Whatever it may be, the Michigan Central will doubtless be most affected by it.

As to the profit the Grand Trunk will get out of the traffic awarded to it, that cannot be exactly or even approximately calculated, because we cannot tell what it will do with it. For such as goes to Montreal, it will get the total earnings; for that going to Boston and New England, by way of Montreal, three-fourths or so of the whole; for that going to New York or New England, by way of Buffalo, something more than one-half of the through rate—the same share as the Lake Shore, with which it corresponds exactly, bowing to the north between Chicago and Buffalo, as the Lake Shore bows to the south, and being a little shorter than the Lake Shore's line (530 against 540 miles). Moreover, we do not know how much business heretofore brought to it by the Michigan Central the Grand Trunk will lose.

As to the new road, the Chicago & Grand Trunk,

its share of the Chicago-New York rate via Buffalo will be about one-third, or \$2 per ton at the present rate, equivalent to about \$430,000 on 10 per cent. of last year's business, or \$1,344 per mile of road; this, with its six per cent. of the live stock and such passenger business as it can command, is a pretty good start to get from through traffic in one direction, when rates are well maintained, so that there is a pretty good margin for profit. If hereafter the lake marine should be so increased as to reduce lake rates, and through rail rates in consequence, much below this summer's rates, of course this would suffer with the other roads, and the reduction in net earnings would be much more in proportion than that in receipts; would, indeed, be equal to it in amount.

So far as we have heard, disinterested judges regard the award of the arbitrators as a very fair one, with which all parties ought to be satisfied. Of course, should any considerable change in the course of shipments take place, and any of the Chicago lines increase its advantages to shippers more than the others, it may have to be revised. There is provision for that, in due time and manner; but for the present situation it seems very fair, and, doubtless, all the roads will work under it very cheerfully.

THE ACCIDENT ON THE WEST JERSEY & ATLANTIC RAILROAD.

In another column the testimony of the engineer who was in charge of the train which ran into one in front of it on the West Jersey & Atlantic Railroad is given in full. Perhaps it would be hard to find anything more melancholy than the account of this man, and his confession of ignorance, which was primarily the cause of the accident and the loss of so many lives and injury to many other persons.

A brief description of the two kinds of brakes referred to in his testimony may perhaps make the matter clearer to many readers. By the "Westinghouse" brake the witness evidently meant the first form, and by the "automatic" the last form of brake invented and introduced by Mr. Westinghouse. Generally, these are called the "old Westinghouse brake" and the "automatic Westinghouse brake." The old brake consists of a reservoir on the engine or tender, which is filled with compressed air by an air-pump in the engine. Under each car there is a cylinder with a piston connected to the brake levers. These cylinders are connected to the reservoir on the engine by a longitudinal pipe extending under each car and coupled together between them by rubber hose, so that the pipe is continuous through the whole length of the train. Before starting, the reservoir on the engine is pumped full of compressed air. To apply the brakes, the air is simply admitted from the reservoir into the pipe and through it to the cylinder and behind the pistons. The latter are then forced outward and act on the brake-levers, and thus the brakes are applied. It should be observed that when the brakes are not "on," that is the blocks are not pressed against the wheels, there is no air in the cylinders nor in the pipe extending from one end of the train to the other. To apply the brakes, air is admitted to the pipe, and it then flows back to the cylinders under each car.

The defect of this brake is that a considerable amount of time—that is, some seconds—is required for the air to flow through the pipe and fill each cylinder, which must be done before the brake is applied. The longer the train, of course, the more time is consumed, which is of great importance if danger is encountered, especially in running at high speeds. Besides this, if for any cause the train breaks in two, or the cars are uncoupled, it becomes impossible to apply the brakes to the back part of the train.

To obviate these defects, Mr. Westinghouse designed what is called the "automatic" brake. This, besides the cylinder, also has a reservoir under each car, which is connected by pipes with the air-pump on the engine, as described, and also by a pipe with the cylinders. Before starting, these reservoirs should be pumped full of compressed air, just as the reservoir on the engine is with the old brake. Between the reservoirs and cylinders under the cars there is a very ingeniously contrived valve—called a triple valve—which, so long as the pressure of the air in the longitudinal pipe is not less than that in the reservoirs, remains open, or rather it maintains communication between the pipe and the reservoir. As soon as the air in the longitudinal pipe is allowed to escape the triple valve closes the communication between the former and the reservoir, and opens that between the reservoir and cylinder. The result is that the air stored up in the reservoirs is instantly applied to the pistons, instead of being obliged to flow from the engine back to each car, as it must in the old brake. In other words, with the automatic

brake the compressed air is stored up under each car ready for use, whereas, in the old brake, it is stored up in a single reservoir on the engine. For this reason the automatic is much quicker in operation than the old brake.

It will be observed, too, that in applying the old brake communication must be opened by a valve or cock on the engine, between the reservoir and the longitudinal pipe. *The latter is, therefore, filled with compressed air when the brakes are applied.* In the automatic form, on the other hand, the longitudinal pipe is filled with compressed air when the brakes are off, and to apply them the air is allowed to escape from this pipe, which operates the triple valve as described. This, then, is what was meant by using the one "the reverse" of the other.

It is evident that with the automatic brake, if the train breaks in two and the air thus escapes from the longitudinal pipe, the brakes will be applied to the back part of the train which has broken loose. The bursting of a pipe, or coupling hose, will have the same effect, so that any defect in the parts results in stopping the trains, whereas with the old brake a defect might not be discovered until the effort was made to stop, and failed, which might be attended with great danger.

It is not clear what the unfortunate engineer meant when he said, "I should have kept turning the lever to pump air in the cylinders." What seems probable is, that he turned the valve so as to open communication between the longitudinal pipe and the external air—as he should have done with the old brake—and that, consequently, the reservoirs under the cars were not filled by the pump, and that when the occasion came to use the brakes there was no compressed air in the reservoirs to apply them.

It is perhaps not best to attempt to fix the responsibility for the accident with the evidence before us. The question of course must come up, Who was responsible for placing a man ignorant of the working of the brake in charge of the engine which caused the terrible loss of life. This will doubtless be answered by the investigation. However this is decided, poor Aitken can not be held guiltless. He was employed on a road on which the automatic brake was in constant use. Why did he not acquaint himself with its principles and the method of working? It should be a lesson to all locomotive runners not to neglect to acquire such knowledge as they may at any moment be called upon to use. It is an old story, and sounds like stale advice; but if this class of men spent a little more time in study and reading, and much less in idle gossip, it would be better for them, and in this case how immeasurably better for the poor victims of this unhappy man's ignorance.

The cause which led to the accident also suggests the importance of a thorough examination of locomotive runners, to determine whether they have the requisite qualifications for the performance of their duties. Among the subjects for examination is that of the working of air brakes. The automatic brake is undoubtedly an intricate piece of mechanism, and it would be impossible almost for any one to understand its construction or operation from a mere external examination without the aid of drawings. This intricacy is without question a great objection to its use, but it is a choice of evils. The complication and intricacy of the locomotive is an objection to that machine, but thus far no way has been discovered by which it can be obviated. The same thing is true of the Westinghouse brake. At present it is certainly one of the most efficient brakes in use, especially for long, heavy and fast trains. That it may be simplified is of course possible. In the meanwhile, the question is, whether this effective mechanism for stopping trains and protecting human life shall be used, or whether it shall be discarded because it requires the employment of intelligent men and constant care, watchfulness and expense to keep it in good order. If it is maintained so as to be at all times effective, it must be placed in the hands of intelligent men. This is part of the price which must be paid for the security it gives.

Considering how much the men on railroads need instruction, it would seem as though it would be a good plan to supply some more effective means for giving it to them. There should be some person to whom men could always apply freely for information when they want it, and who would give it to them cheerfully. Often such application to the master mechanic, or the person in authority over them, is resented, or given in a surly, ill-natured way, which discourages those who need instruction.

Most of us, too, know the kind of man who will not give other people the advantage of what he knows. "They won't give themselves away. They learned by hard knocks all they know, and they intend to keep it

to themselves." It happens often, therefore, that a poor fellow like Aitken, who earnestly wants to learn, has nowhere to go for instruction. It would seem that it might be a good step to appoint instructors for the employés of railroads. Thus, suppose a competent man was appointed to travel over a road, visit all the shops and give a series of short, simple lectures on subjects relating to the practical duties of the men. After the lecture let him announce that he would be at a specified place during certain hours of the day and evening, for the purpose of answering questions and giving information to those who wanted it, and that he was paid by the company for doing this, and therefore all might apply who desired to do so. Such instruction, if given by a competent person, would do much good, and probably be in a very great measure effective in preventing accidents resulting from the kind of ignorance which caused poor Aitken to blunder so terribly.

THE CHICAGO & NORTHWESTERN RAILWAY.

After several years of waiting and struggling, this company at last seems to have reached the point when its stockholders can look with reasonable certainty for regular and considerable returns on their investment. The immigration of the past three years, the rapid growth of Western Minnesota and Dakota, the revival of activity in the older parts of the Northwest, and the new activity in the iron and the lumber trades are having their effect on a property which, during the extreme depression, though its stockholders suffered, was put into condition to be worked and maintained economically, and provided with new feeders at an extremely low cost. The economies in operation were felt especially in the fiscal year 1878-79, because then, in the face of a great failure of crops in Minnesota and Northern Iowa, increased dividend payments were possible. This last year, with better but not good crops, there is an increase of 30 per cent. in the net earnings, which are equivalent, after paying all fixed charges, to 11½ per cent. on both common and preferred stock—certainly a very satisfactory result to the stockholders, who, however, have received but 7 per cent. on their preferred and 6 on their common stock.

This company has been and is engaged on some important additions to its lines, but none of these have been in operation long enough to have had much effect on the company's aggregate traffic or earnings. The mileage at the close of the year was 358 miles more than at the beginning, it is true, but the average mileage worked was only 86 miles more than in the preceding year. With this increase of 4½ per cent. in mileage worked, the company had 21 per cent. more passenger traffic and 27 per cent. more freight traffic, and earned 19 per cent. more money; but this great increase in traffic was carried with an increase of but 10¼ per cent. in working expenses, so that the net earnings increased no less than 30 per cent. And the fixed charges—payments for interest and rentals—having increased but very little meanwhile—about \$242,000—the surplus representing the net profits of the shareholders was 78½ per cent., increasing from \$2,287,628 to \$4,080,168. This tremendous change in the income of the shareholders was made in spite of lower average rates, and because of larger traffic due to greater general prosperity and to a considerable reduction in the cost of transportation per unit of traffic.

It must be borne in mind, however, that a considerable part of these stockholders' profits, both this year and heretofore, are in a form that cannot be made available now, nor for some time to come, for division. Every year the working expenses and interest on the bonds of the proprietary roads largely exceed their gross earnings, and the deficit has to be met from the surplus of the Chicago & Northwestern, for which it has a claim against those roads, but one which at present they are unable to meet. About a million dollars seems to have been invested in this way last year—at least the balance due from the proprietary roads increased by so much in that time. It is virtually an investment in a growing property not yet able to return profits, but which certainly will become so. When that time comes we may expect the Chicago & Northwestern stockholders to get returns on this investment in one shape or another. Additions are being made to these proprietary lines constantly. One will probably reach the Missouri River in Dakota this year; a second will supply a line parallel to the Iowa Division more than half way across the state. These and other new lines the company is building at a very low cost. Most of those constructed this year are paid for from the proceeds of an issue of 6 per cent. bonds at the rate of \$15,000 per mile; yet they are laid with steel rails, and in Iowa are ballasted as they are constructed, and can

be maintained for a long time at very low cost. The time when they will become directly profitable will depend in many cases on the rapidity with which the country along them is settled and brought under cultivation. Last year was discouraging to immigration, yet it was not interrupted, and the better crops this year are likely to encourage the rapid growth which hastens the day when these new roads will become profitable in themselves and not only as feeders of the existing lines.

Pretty much all the new road worked by the company last year formed part of the "proprietary roads," and most of it was attached to the Winona & St. Peter. Only one-tenth of the increase in earnings, however, was on the proprietary roads. In the aggregate their gain was 23 per cent., against 18.6 by the Chicago & Northwestern proper. These proprietary roads are valuable now only because of the traffic which they bring to the other roads. Their aggregate earnings last year were \$1,436,473.43, and their expenses \$1,432,003.18 so that substantially the whole of the interest on their bonds had to be paid from the profits of the other roads. This is largely a matter of dividing rates, however; the Chicago & Northwestern's aggregate net earnings would be materially less if it did not have these roads, which, moreover, are the parts of its system where the most rapid growth of traffic is to be expected. The receipts of each of these roads, except the Toledo & Northwestern, which as yet has not been worked the whole of one year, have been as follows for eight years:

	W. & St. P.	N. W. U.	Iowa Mid.	Total earnings.
1872-73.....	\$723,616	\$100,000	\$84,781	\$908,397
1873-74.....	794,829	\$163,049	98,023	1,055,892
1874-75.....	342,503	236,574	88,516	667,593
1875-76.....	431,153	268,534	108,367	1,068,054
1876-77.....	577,270	269,658	100,017	946,945
1877-78.....	795,663	280,929	90,623	1,167,215
1878-79.....	807,411	278,451	74,453	1,160,315
1879-80.....	1,033,208	327,987	69,717	1,430,912

Last year the Winona & St. Peter worked about 70 miles more road on the average than the year before, so that its increased earnings must be ascribed partly to this. All the roads but the Iowa Midland show larger earnings last year than ever before. The better crop in Minnesota this year is likely to give a further and a greater improvement to the Winona & St. Peter earnings during the current year. The time is probably not far distant when this road will earn three times as much as it now does; as its earnings per mile last year were but \$2,300, this is not prophesying any remarkable results.

But without counting on the new roads, this company has prospects for substantial progress. The older states in which its lines lie are very prosperous, and business of most kinds in them is active and increasing, and the people are growing wealthy; the traffic tends constantly to become more like that of the Eastern states, large in local freights, raw materials and products of manufactures, passenger traffic and the like. While the agricultural population does not and probably will not grow in Illinois, Wisconsin and Eastern Iowa, the towns do grow rapidly, and in Central and Western Iowa, as well as in Minnesota and Dakota, there are vast quantities of land yet to be made into farms. A well placed road with a light capital account in a country like this may reasonably be expected to make great progress in traffic, earnings and profits.

East-Bound Rates and Lake Shipments.

Chicago shipments eastward were 23,285 tons for the week ending Aug. 14, against 35,008 the previous week, and 25,568 for the week ending July 31. Some of the Chicago papers call these very light shipments, and declare that rates ought to be reduced to enable the railroads to compete better with the lake vessels. The railroads have tried competing with the vessels before this, and we think they have had enough of it. It has been discovered that the vessels can reduce their rates just as fast as the railroads can, and, what is worse (for the railroads), can pay their expenses and have something left for interest on the owners' investment at rates that will not begin to pay expenses on the railroads. When the railroads got to carrying for 9 cents a bushel from Chicago to New York last year, or about 5 cents a bushel to Buffalo, the vessels carried for 1¼ cents. They did not like to, but they did it, and, moreover, they did it for weeks together for three successive years. It seems at last to have dawned upon the railroads that a great fleet of vessels which can do nothing but carry grain is bound to get grain to carry at some rate or other, if there is any in the market.

But after all that is said, the railroads are not doing so very badly, even out of Chicago, where most of the grain always goes by lake when navigation is open, and especially in midsummer. In July of last year the open rate was 20 cents; this year it has been 30 cents. The total rail shipments from Chicago were about 145,000 tons last year; they have been 160,000 tons this year. The earnings from the July shipments were about \$580,000 last year, and \$660,000 this year. In view of these facts the railroads will probably not feel very badly because the lake vessels have had a very prosperous July this year for the first time in many years. But even if we select a period when the rail shipments were

lighter this year than last, we do not then find good reason for reducing rates to meet lake competition. During the first two weeks of August the Chicago shipments eastward were 68,293 tons this year, which at 30 cents per 100 lbs. or \$6 per ton yielded \$409,758. Last year during the same two weeks the shipments were 74,954 tons, or nearly 10 per cent. more. Of this quantity, 13,811 tons were carried during two days while the rate was 20 cents; the rest at 25 cents. At these partly restored rates the larger tonnage last year earned \$360,959. Thus the railroads, carrying 10 per cent. less this year, earned gross 13½ per cent. more. But certainly three-fourths of the earnings last year were absorbed by expenses, say \$270,000, leaving \$91,000 of net earnings. Now, even if we allow no decrease in expenses for the 10 per cent. decrease of business this year, we at least have the whole of the \$48,800 of gain in receipts to add to net earnings; so the result of the two years' practices appears as follows to the railroad man: Profits last year, \$91,000; profits this year, \$139,800; and he concludes that this year's plan is 53½ per cent. better than last year's plan, and he does not propose to throw away these profits because the lake carrier's business may have improved more than railroad business.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Metropolitan Elevated.—The Second Avenue Line in New York is extended from Sixty-fifth street to One hundred and twenty-seventh street, 3 miles.

South Florida.—Completed from Sanford, Fla., to Lake Maitland, 16 miles.

Southern Pacific.—Extended eastward to Railroad Pass, Arizona, 34 miles.

Atchison, Topeka & Santa Fe.—Extended southward to Socorro, N. M., 20 miles.

This is a total of 73 miles of new railroad, making 2,704 miles thus far this year, against 1,346 miles reported at the same time in 1879, 1,005 miles in 1878, 943 miles in 1877, 1,231 miles in 1876, 607 miles in 1875, 916 miles in 1874, 2,028 miles in 1873, and 3,485 miles in 1872.

THE MINNESOTA CROPS are reported by Bureau of Statistics of the state to have covered the following acreage for the last two years, the figures coming from the town assessors through the county auditors:

	1880.	1879.	Increase.	P. c.
Wheat.....	2,963,325	2,702,521	260,804	7.27
Oats.....	688,415	567,371	121,044	21.33
Corn.....	455,514	379,706	75,748	19.95
Barley.....	118,856	96,951	21,905	22.59
Total.....	4,226,110	3,806,609	419,501	11.02

An increase of 11 per cent. in the area of grain cultivated is certainly very large for a state so old as Minnesota, though, for that matter, it is comparatively a small part of it that is not decidedly new—newer than Kansas or Nebraska. What is more striking is that the wheat acreage did not increase nearly so fast as that of the other grains. In 1879, 72½ per cent. of the whole acreage was wheat; in 1880, but 70 per cent., and of the 419,501 acres added to cultivation, less than half (48 per cent.) was sown to wheat. The gain in other grain was about equal. The latitude of the state is indicated by the fact that more ground is given to oats than to corn, which is probably not true of any state further south, unless it may some Eastern state. The contrast with Illinois is very strong. The latter state, in 1878, had more than five times as many acres of corn as of oats. Putting them in percentages, the acreage of these grain crops in several different Western states were (Minnesota in 1880, and the others in 1878):

	Wheat.	Oats.	Corn.	Barley.
Minnesota.....	70.1	16.3	10.8	2.8
Wisconsin.....	45.7	23.6	26.3	4.4
Illinois.....	18.9	12.7	67.7	0.7
Iowa.....	35.2	11.5	51.0	2.3
Nebraska.....	41.3	7.5	50.3	0.9
Missouri.....	30.5	10.6	58.9	...
Kansas.....	36.3	9.7	52.2	1.8
Indiana.....	30.2	8.1	61.4	0.3
Michigan.....	33.7	15.2	29.4	1.7
Ohio.....	31.1	15.4	52.6	0.9
Tennessee.....	41.7	7.4	50.9	...
Pennsylvania.....	37.5	29.7	32.1	0.7

We may understand from this why Minnesota is called a wheat state. There are many states that are much more important agricultural states than it. In 1878, seven of the twelve states in the above list had a larger area cultivated to wheat, oats, corn and barley—Illinois, Iowa, Missouri, Kansas, Indiana, Ohio and Pennsylvania—than Minnesota had in 1879, and Tennessee very nearly the same. But Iowa alone had a larger acreage of wheat. Since 1878, however, there has been a large increase of acreage in wheat in several of the older states that grow winter wheat, notably in Illinois, Indiana, Ohio and Michigan. But, after all, Illinois had nearly three times the area in the four grains named in 1878 that Minnesota had in 1880, Iowa more than twice as much, Indiana 70 per cent. more, Ohio and Missouri nearly one half more, Kansas a tenth more.

THE FIXED CHARGES OF THE LOUISVILLE & NASHVILLE form the subject of an elaborate review in the *Commercial and Financial Chronicle*, based on the statement recently made in the Louisville *Courier-Journal* and copied in these columns week before last, and widely accepted as semi-official. The *Chronicle* has been unable to get official information, but its careful investigation makes the yearly interest hereafter accruing on the funded debt \$2,726,003, instead of \$2,562,000, as given by the *Courier-Journal*. It further goes on to estimate the gross and net earnings of the current year—beginning with last month—which it is rather dangerous to do even with the fullest information, and con-

cludes that they are more likely to exceed than to fall below \$4,000,000, after paying rentals, and that the surplus over the interest charges will be equivalent to more than 14 per cent. on the \$9,052,950 of stock now outstanding.

American Locomotives on New Zealand Railroads.

The following letter, dated from New Zealand, May 22, is copied from the *English Mechanic*. It contains some very strong testimony in favor of American locomotives, and will interest many of our readers here and abroad:

In my letters on the railways of New Zealand I have had occasion to allude frequently to the American engines which are in use on the main trunk line of the South Island—a line now extending to a length of 755 miles, an entire railway system reaching to 1,172 miles. I also mentioned in a recent letter that the importation of these American engines had excited disapprobation in some quarters, and had been the subject of an official paper presented to Parliament in its last session.

The first two of these engines were procured as an experiment, to run passenger trains on our light railways (3 ft. 6-in. gauge, and 40 lb. rails), where the traffic was large enough to make it profitable to separate the passenger from the goods traffic, instead of working both by mixed trains, the usual practice in this colony. It was believed that the large experience of American builders in dealing with the requirements of very narrow gauge lines and light rails would enable them to supply engines more suitable to the New Zealand railways than English engineers or builders would be likely to produce. It is not my intention just now to express any opinion as to the correctness or incorrectness of this view; I may deal with that from a practical standpoint at another time. Suffice it to say, meanwhile, that the two Yankee pioneers did much good work and gave so much satisfaction, that six more were procured, and the eight are now performing the passenger traffic on the Southern main line with entire success.

In a former letter, I gave some description of these engines, and on looking over it again, I do not see much that needs correction. I may add to what I then wrote, that the engines have wagon-top boilers, and the bogie wheels are of chilled cast-iron. The great advantage in their construction is the system of compensating springs, which reduce to a minimum the shocks caused by the inferior road. The first two engines, which have now been at work for just two years, have run in that time about 100,000 miles each, at an average running speed of very nearly 30 miles an hour. The engine which takes the Christchurch and Dunedin express goes right through from Christchurch to Oamaru, a distance of 152 miles. I shall give in a future letter some particulars as to the work done. * * * I should explain that these engines were of a new design, and required entirely fresh patterns. The ordinary American passenger engines designed for such work have a leading four-wheel bogie, and are "coupled behind." It was decided to build these engines for New Zealand with leading and trailing two-wheel bogies, as increasing their flexibility, and the driving-wheels are coupled in front. It is doubtful whether this special design has any advantage over the ordinary American design. I think the weight of evidence goes rather the other way. This, however, is another instance of our amateurish experimenting in locomotive matters.

The heavy grain traffic on the Southern main line proved beyond the capabilities of the most powerful engines in use up to this year. The large "Mogul" engines, class "J" (built by the Avonside Co., Bristol, and Dübs & Co., of Glasgow), did admirable work on the straight and level line from Christchurch to Oamaru, but were not strong enough to overcome the severe gradients (1 in 50 for many miles) between the latter place and Dunedin, while, for the sharp curves which abound over that length, their wheel-base was too long. It was determined, therefore, as additional engines were wanted, to try the American "Consolidation" pattern.

Six of that class were, therefore, imported from the Baldwin Works, Philadelphia, and are now at work on the section above referred to. They run on ten wheels, eight being coupled, the two middle coupled pairs being broad in the tread, and unflanged. There is a leading two-wheeled bogie, with chilled wheels. The coupled wheels are 3 ft. in diameter, and the cylinders are 15 in. in diameter, with 18-in. stroke, thus giving 112.5 lb. tractive force. They weigh about 34 tons, and, with tender, about 46 tons. The tender runs on two four-wheel bogies, as in the case of the passenger engine. The "Consolidation" engines, on their trial trip, took one hundred loaded wagons on the level with ease, the gross weight being about 800 tons, and on a gradient of 1 in 50, with 5-chain reverse curves, they take twenty-seven wagons, representing a load of over 200 tons, while the distribution of their weight on eighteen wheels (engine and tender), with the three bogies, and two pairs of unflanged wheels, makes them comparatively very light on the rails. The experiment is regarded as thoroughly successful, and the engines are great favorites for the heavy goods traffic, which they work very economically.

There is one more class of American engine now in use out here which I need not illustrate, as it is almost exactly like the "K" class in outward appearance, excepting that instead of having a two-wheel trailing bogie and an eight-wheeled tender, it is a tank engine and has a four-wheel trailing bogie. Another difference not readily perceptible outwardly is that the cylinders are 11 in. instead of 12 in. Like the "K" class, it is built at the Rogers Works, Paterson, N. J. Two of these were procured to work light branch traffic, and do that satisfactorily, but they are not powerful enough for goods or mixed traffic; and I understand that no more of this class will be imported. Indeed, the feeling against going to America for rolling-stock has grown so strong that I doubt whether any American engines will be imported in future, notwithstanding the marked success of the two classes above illustrated.

The Governor of Georgia on Georgia Railroad Questions.

Governor A. H. Colquitt, of Georgia, in accepting a nomination for that office, speaks of railroad questions in the state as follows:

It may not be inappropriate in this connection for me to say something on the subject of our system of transportation, as it is one that very materially affects the interests of our fellow-citizens. Much complaint having been made in reference to the inequalities and discriminations in our railroad system, the last General Assembly took up that question, and after great deliberation passed the act now upon our statute book, a leading feature of which was the establishment of a railroad commission. It was not to be expected that the Commissioners could in a short time so adjust the whole railroad system in Georgia as to prevent all discriminations and do justice alike to all the people and to the railroad companies. I am gratified to learn, however, that very great progress has been made toward a satisfactory solution of this whole question. I cannot doubt that

the able and intelligent gentlemen who have the matter in charge as Commissioners, will during the coming year be able to harmonize the different conflicting elements, and to so systematize the whole business of transportation by rail in the state as to place it upon a just and equitable basis. I trust that both the transportation companies and the people will be content to await developments for a reasonable time until the problem has been fairly solved. The people of the state have the right to demand that their freights be carried at the lowest figure that will secure to the stockholders who have invested their money in railroad enterprises reasonable and just dividends upon the investment.

While on this point I desire to remark further that I am aware that considerable disquietude has been manifested by our people in reference to our great state property, the Western & Atlantic Railroad, growing out of the extensive combinations and consolidations of the railroad interests, and the rapid changes which have been made in the ownership of the different lines connecting with our state system, and especially with the Western & Atlantic Railroad.

I have looked carefully into the lease and to the act providing for the lease of the Western & Atlantic Railroad, and I find that all discriminations against persons or corporations in this state are positively forbidden by that act. It will be my purpose to see that this act is faithfully carried out in letter and spirit.

The Western & Atlantic is a great public highway, connecting the transportation lines between the coast and the West and it should be perpetually used as an open highway over which every person and every railroad company should have an equal right to pass upon terms of perfect equality. To carry out this object, it will be very important that the state should retain at all times the control of this great highway in their own hands. I am, therefore, opposed to the sale of the Western & Atlantic Railroad, and should not hesitate to withhold my signature as the executive of Georgia from any act providing for the sale of the road, or of any disposition of it that puts it beyond the power of the state to keep it open alike to the use of all corporations and all citizens upon terms of perfect equality.

While these remarks are probably not elicited by your communication, they relate to subjects of public interest so momentous in their character that I feel I owe no apology for having made this public statement in reference to my position and policy on these vital issues.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

Indiana, Bloomington & Western, annual meeting in Indianapolis, Sept. 8. Transfer-books closed Aug. 18.

Dividends.

Dividends have been declared as follows:

Illinois Central, 3 per cent., semi-annual, payable September 1.

Chicago & Alton, 3½ per cent., semi-annual, payable September 4.

Foreclosure Sales.

The **Waynesburg & Washington** road is again advertised to be sold at sheriff's sale, September 4, under a judgment held by Ezra M. Sayers, of Waynesburg, Pa. It is, however, likely that this judgment will be settled before the day of sale, as others have been.

The **Flint & Pere Marquette** road was sold in East Saginaw, Mich., Aug. 18, under a decree of foreclosure of the consolidated mortgage, the prior mortgages remaining. The road was bought for \$1,000,000 by a purchasing committee representing the bondholders. The sale includes about 285 miles of road and a large land grant. A plan of reorganization has been agreed upon, under which the former consolidated bonds will be represented by stock of the new company.

American Society of Civil Engineers.

A meeting of this Society will be held at its house, No. 104 East Twentieth street, New York, Wednesday, Sept. 1, at 8 p. m., at which a paper by J. Vincent Browne, C. E., on "The Harbor Improvements of Quebec" will be read and discussed.

Members of this society are invited by the American Institute of Mining Engineers to take part in the Institute's Lake Superior meeting, including the excursion on a steamer on Lake Superior. To do this they will leave New York Aug. 20, leave Chicago on the morning and reach Marquette on the night of Aug. 23. Members who desire to go must immediately notify Prof. T. M. Drowne, Secretary of the Institute, at Easton, Pa.

Southern Railway and Steamship Association.

The annual convention was held in Atlanta, Aug. 10, with a full attendance. Little but routine business was transacted, the rate committee recommending no change in rates, its work having been confined to a general lining up and equalization. The old officers were all re-elected for another year.

The location of the offices of General Commissioner and Secretary was fixed at Macon. The office of the President remains in Atlanta.

The time of the annual meeting was changed to the fourth Wednesday in October. The next annual meeting will be held in October, 1881.

Western Railroad Weighing Association.

The adjourned meeting was held in Cleveland, O., Aug. 10, in pursuance of the call made at the previous meeting. The chief business of the meeting was the appointment of a committee to consider and revise the present classification of car-load freight, with a view to a general understanding in relation thereto.

Master Car-Painters' Association.

The following circular has been issued from the Secretary's office, Kent, O., dated Aug. 12, 1880:

"The eleventh annual convention of the Master Car-Painters' Association will be held in St. Louis, Mo., opening on Wednesday, Sept. 15, 1880, at 10 o'clock a. m.

"The Laclede Hotel has been selected as the headquarters of the Association, where special arrangements have been made for delegates. Rate per day, \$2. The use of parlors in which our meetings will be held have been secured in this hotel.

"Those desiring to secure rooms, will communicate with the Chairman of the Committee of Arrangements, George Forby, No. 3, 105 Clark avenue, St. Louis.

"The Association cordially invite all master car and locomotive painters, and foremen painters who may be in charge of division shops on any road are invited to meet with us, and come ready to give their views and to hear from others, thus giving and receiving instruction from practical men in the art of painting railway rolling stock.

"We would again ask the master car-builders and master-mechanics of the country to interest themselves by sending

their foremen painters to the convention: they will thereby be advancing the interests of the roads or shops they represent, as valuable ideas may be found by any foreman painter seeking after instruction, and who desires to keep posted in the progress being made in car painting.

"Members who have the introducing of the several subjects named below, for discussion, will notify the Secretary five days previous to the meeting should they be unable to attend; they will also forward their views on the question, that they may be presented to the convention.

"The annexed subjects will be introduced for discussion in the following order, by the member whose name is attached:

"1. Which is the most durable and the least expensive to maintain, light or dark colors on car-bodies?—Wm. Davis, Canada Southern Railway, St. Thomas, Ont.

"2. Which makes the best foundation for a dark-colored car-body, iron or lead paint?—H. C. Burch, Wagner Car Works, West Albany, N. Y.

"3. What makes the best finish for passenger car floors? Geo. Sage, Cleveland, Columbus, Cincinnati & Indianapolis Railroad, Cleveland, O.

"4. What is the most durable and economical for blacking locomotive stacks and fire boxes?—J. C. Stout, Kansas Pacific Railway, Wyandotte, Kan.

"5. Which is the most durable finish for inside coach work, a gloss finish or rubbed and oiled?—D. C. Cooley, late of Chicago, Burlington & Quincy Railroad, Aurora, Ill.

"6. Should wood or veneered head-linings be oiled, or left flat after rubbing?—C. E. Bradley, Pullman Car Works, Detroit, Mich.

"7. What is the best method of mixing putty for passenger car work, speed and durability combined?—E. C. Stow, Detroit, Grand Haven & Milwaukee Railway, Detroit, Mich.

"8. The best way of preparing a locomotive tank that is rusty, for painting, after the old paint is scraped off.—Wm. Amerson, Chicago & Northwestern Railway, Chicago, Ill.

"9. Will varnish wear as well on a color composed largely of burnt umber as it will on a similar shade of color where umber is not used?—M. W. Stines, Barney & Smith Car Works, Dayton, O.

"10. Is it necessary to paint the back of car panels and sheathing?—Geo. Forby, Missouri Pacific Railway, St. Louis, Mo.

"11. What is the best method of painting locomotive tanks, both outside and the water space, to prevent them from rusting?—John Rattenbury, Chicago, Rock Island & Pacific Railway, Chicago, Ill.

"12. Which is the most durable and best adapted to railway buildings and bridges, iron or lead paint?—T. J. Hansen, Columbus & Hocking Valley Railroad, Columbus, O."

"R. McKEON, Secretary."

International Road-Masters' Association.

The second annual convention of the International Road-Masters' Association will meet at the Matteson House, Chicago, Wednesday, Sept. 8. The meeting will be called to order at 1:30 p. m. All road-masters and assistant road-masters are invited to attend.

Mr. J. W. Kennedy, Vice-President of the Association, will deliver the address.

The committee appointed at last annual meeting to prepare questions, report the following for discussion, which all road-masters are invited to take part in:

1. Report of Committee on Frogs and Switches, and discussion of same.

2. Comparative action of frost on different material composing road-bed, and tests made of obviating heaving; utility of tile and deep ditching.

3. Best manner of ballasting with rock, whether to use crusher or break with hammers; saving in cost of repair from using rock ballast, with actual figures; comparative merits of rock and other kinds of ballast.

4. Best modes of preventing creeping of track and providing for expansion, with actual results of experience.

5. Best weight and form of spike, with specimens and number per keg.

6. Best form of joint for 60 to 70 lb. rail.

7. Best nut-lock, with specimens.

8. Rails.—Best form and weight for present rolling stock, with sections or tracing.

9. Elevation of curves.—Should the outer rail be elevated or the inner rail depressed? What should be the maximum limit of elevation? Adjusting the elevation upon reversed curves.

10. Ties.—Review of last year's discussion of time of year for cutting. Relative merit of preserved woods. Iron and glass ties, with opinions.

At the last meeting the President was instructed to appoint a committee of one in each state, territory and province, for the purpose of procuring the names and address of all road-masters in their several states, territories and provinces. As quite a number of that committee have not reported, there will doubtless be a great many who will not receive one of these notices; therefore, members are earnestly requested to extend the invitation to all the road-masters or assistant road-masters in their vicinity. Badges will be furnished at hotel office on application.

The committee further request all road-masters to bring to the convention short written papers upon any of the ten questions for discussion.

Joint Executive Committee Meeting.

Commissioner Fink has issued a call for a meeting of the Joint Executive Committee, to be held in New York, August 26. Besides the ordinary current business the meeting is to consider the question of pooling east-bound freight business from Terre Haute, Vincennes and La Fayette, and such other business as may be brought before it.

ELECTIONS AND APPOINTMENTS.

American Railway Improvement Co.—The officers of this company are: President, Gen. G. M. Dodge, Council Bluffs, Ia.; Vice-President, J. P. Scott, Philadelphia; Secretary, Francis W. Baldwin, Denver, Col.; Treasurer, C. F. Woerisshoff, New York. This is the company which has taken the contract to complete the New Orleans Pacific.

Central of Georgia.—Major G. A. Whitehead has been appointed General Passenger Agent, with office in Savannah. Mr. J. B. Preston succeeds Major Whitehead as General Agent at Augusta.

Chicago, Hannibal & St. Joseph.—At a meeting held Aug. 18 the following directors were chosen for this new company: John B. Lyon, George C. Walker, N. K. Fairbank, F. M. Dowd, Jay Gould, Myron P. Bush, Hiram H. Cook, Charles B. Farwell, S. J. Medill, J. W. Singleton, Russell Sage, Julius Hallgarten. The directors then elected William Dowd President, and John W. Hilton Secretary and Treasurer.

Chicago, Rock Island & Pacific.—Heretofore the General Freight Agent and General Passenger Agent of this company have been charged with the duty of auditing the accounts of their respective departments. They are now to be relieved of this duty and the following appointments have

been made: A. Temple, Auditor of Passenger Account; G. H. Crosby, Auditor of Freight Accounts. They will report to the Treasurer.

Frankfort & Kokomo.—Mr. E. H. Waldron has been appointed General Manager, in place of E. Y. Comstock, resigned. Mr. Waldron has been General Superintendent of the Cincinnati, Lafayette & Chicago and the Ohio & Mississippi, and was more recently General Manager of the La Fayette, Muncie & Bloomington.

Galveston, Houston & Henderson.—The following circular from Vice-President and Manager W. H. Harding is dated July 31:

"J. H. Crowley, Master of Track, Stations and Trains, and Oscar G. Murray, General Freight and Passenger Agent, having resigned their respective positions, to take effect Aug. 1, 1880, the following appointments are announced, to take effect from and after this day: J. S. Sherwood, Acting Master of Trains and Stations; Thomas F. Fisher, Acting General Freight and Passenger Agent.

"The Track and Mechanical Department, heretofore in charge of the Master of Track, will hereafter report directly to the Manager."

Kansas City, St. Joseph & Council Bluffs.—Mr. C. M. Carter has been appointed Assistant Treasurer and Auditor, and Mr. A. R. Storer Cashier and Paymaster. Offices at St. Joseph, Mo.

Little Rock, Mississippi River & Texas.—Mr. Samuel I. Phelps has been appointed Assistant Superintendent. He has been for some years a conductor on the road.

Macon & Brunswick.—Mr. A. A. Sharpe, of Macon, Ga., has been appointed General Freight and Passenger Agent in place of Henry M. Drane, resigned.

Memphis & Little Rock.—Mr. James Harrington has been appointed General Manager, in place of Rudolph Fink, who has gone to the Selma, Rome & Dalton. Mr. Harrington has been for some time past Chief Engineer and Land Agent of the company.

New York & Brooklyn Elevated.—The directors of this company are: Albert F. Johnson, Daniel D. Badger, Frank B. Johnson, Alfred Hall, Alexander H. Seaver, Alfred Ely, Horatio S. Stewart, H. W. Badger, J. W. Clark, C. P. Shedd, George B. Carrington, John S. Thornton. The board has elected Daniel D. Badger, President.

New York, Lake Erie & Western.—Mr. Charles O. Vedder has been appointed Master Mechanic of the Buffalo Division, in place of Thomas West, resigned.

Ohio Central.—Mr. John B. Morgan has been appointed Master Mechanic. He was recently on the Cincinnati, La Fayette & Chicago road.

Ohio & West Virginia.—The officers of this new road are: Charles Norris, Superintendent; Americus Wilson, Master of Transportation; Wm. Cowell, Master Mechanic.

Portsmouth & Dover.—At the annual meeting in Portsmouth, Aug. 11, the following directors were chosen: Albert R. Hatch, Frank Jones, Daniel Marcy, Wm. H. Sise, Portsmouth, N. H.; Charles H. Sawyer, Oliver Wyatt, Andrew H. Young, Dover, N. H. The road is leased to the Eastern Company.

Southern Railway & Steamship Association.—At the annual convention in Atlanta, Aug. 12, the old officers were re-elected, as follows: President, Joseph E. Brown; General Commissioner, Virgil Powers; Secretary, C. A. Sindall; Board of Arbitration, John Screven, W. R. Arthur, Thomas H. Carter. The offices of the General Commissioner and Secretary were fixed at Macon, Ga., that of the President to remain in Atlanta.

Western Society of Engineers.—At the last meeting of this society (late the Civil Engineers' Club of the Northwest), in Chicago, the following officers were chosen for the ensuing year: President, E. S. Chesbrough; First Vice-President, Moses Lane; Second Vice-President, D. C. Cregier; Secretary, L. P. Morehouse; Treasurer, Charles Fitzsimons; Librarian, J. W. Weston; Trustees, S. S. Greeley, H. C. Nutt and R. J. McClure.

PERSONAL.

—A report is current that Mr. E. B. Stahlman has resigned his position as Traffic Manager of the Louisville & Nashville Railroad.

—It is reported that Mr. Wilson Eddy, for many years Master Mechanic of the Western Division of the Boston & Albany road, has tendered his resignation.

—Col. A. M. Sloan, formerly for several years President of the Savannah, Skidaway & Seaboard Company, died recently at Monticello, Fla., where he had lived for several years.

—It is said that Mr. A. B. Underhill, now Master Mechanic of the Boston & Worcester Division of the Boston & Albany road, will soon be made Superintendent of Motive Power for the whole road. The Boston & Albany has heretofore had no general officer of this kind, the motive power being in charge of the division master mechanics, who are independent of each other.

—Col. Henry M. Drane has resigned his position as General Freight and Passenger Agent of the Macon & Brunswick Railroad, the resignation to take effect Aug. 15. Col. Drane has been with the road for several years, and his resignation caused much regret to the management. He is President of the Southern Association of General Passenger and Ticket Agents.

TRAFFIC AND EARNINGS.

Grain Movement.

For the week ending Aug. 7 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past eight years:

Northwestern		Northwestern Shipments.		Atlantic.	
Year.	Receipts.	Total.	By rail.	Receipts.	By rail.
1873.....	3,920,551	3,769,252	595,031	15.8	3,489,227
1874.....	4,287,152	3,947,530	1,095,988	32.7	3,100,090
1875.....	2,924,504	3,125,584	785,771	25.0	4,640,106
1876.....	3,769,648	3,044,779	1,300,720	42.7	3,061,105
1877.....	4,640,613	4,285,095	950,575	22.2	3,525,053
1878.....	6,353,440	4,872,921	1,449,030	30.8	6,153,704
1879.....	6,271,438	5,368,755	1,870,352	33.3	8,442,315
1880.....	7,202,397	6,528,553	2,125,251	32.6	8,230,866

The receipts at the northwestern markets for the first week of August, this year, were no less than 2,100,000 bushels less than for the week before, when, as we noted last week, they were the largest ever known. The shipments of these markets for the week were nearly half a million bushels more than in the previous week, and have been exceeded but once since June. The greatest change is in the rail shipments, which are the largest of the year since navigation opened, and have very rarely been exceeded while navigation was open. Yet lake and canal rates have been very

much lower than rail rates, and the increase, probably, comes chiefly from shipments from St. Louis and Toledo, which cannot ship by lake conveniently. The receipts at Atlantic ports are less than in the preceding week and less than in the corresponding week of last year, but there were but two other weeks last year and there has been none in previous years when the receipts were so large. Of the northwestern receipts Chicago had 50.1 per cent., Toledo 19, St. Louis 15.6, Peoria 7.9, Cleveland 3.2, Milwaukee 1.8, Detroit 1.8 and Duluth 0.6 per cent. Toledo's and St. Louis' receipts are remarkably large; Milwaukee and Detroit have not begun to receive much as yet, and probably will not until after the Minnesota and Michigan harvests have been threshed.

Of the Atlantic receipts, New York had 41.3 per cent., Baltimore 24.4, Montreal 11, Philadelphia 9.8, Boston 6.9, New Orleans 5.5, and Portland 0.7 per cent. New York's proportion is the smallest for many weeks. Baltimore's aggregate has been exceeded but once or twice in its history, but its percentage of the whole has often been greater. Montreal's receipts are much the largest of the year. Much has been said recently of large shipments from St. Louis down the Mississippi, but the New Orleans receipts have not been large recently, though it has been getting more wheat than usual.

There is still more corn than wheat received at the Northwestern markets, but the wheat shipments thence lead, and wheat forms 62 per cent. of the Atlantic receipts for the week.

Exports of flour and grain for four successive weeks have been:

	Week ending			
	Aug. 11.	Aug. 4.	July 28.	July 21.
Flour, bbls.....	71,183	110,477	93,647	79,175
Grain, bush.....	6,495,959	7,986,382	6,205,671	6,160,334

Exports for the last week were more than two-thirds wheat, of which, in the last four weeks, 15,420,000 bushels have been exported.

Railroad Earnings.

Earnings for various periods have been reported as follows:

Seven months ending July 31:		1880.		1879.		Inc. or Dec.		P. c.	
Cleve., Mt. Vernon & Del.....	\$239,749		\$212,029	I.	\$27,720		12.8		
Denver, So. Pk & Pac.....	902,514		308,083	I.	929,850		301.2		
Ind., Bloom. & W.	673,142		611,600	I.	61,443		10.0		
Nash., Chat. & St. L.....	1,176,299		971,476	I.	204,823		21.1		

Six months ending June 30:		1880.		1879.		Inc. or Dec.		P. c.	
At. & Charlotte Air Line.....	\$401,150		\$336,277	I.	\$64,873		19.3		
At., Miss. & Ohio.....	902,514		715,486	I.	187,028		26.1		
Net earnings.....	455,061		274,524	I.	180,537		65.8		
Chesapeake & Ohio.....	1,259,035		812,808	I.	446,227		54.9		
Net earnings.....	248,234		90,709	I.	157,525		173.4		
Louisville & Nashville.....	3,950,080		2,628,755	I.	1,322,325		50.3		
Net earnings.....	1,615,708		1,060,571	I.	546,137		51.1		
St. L., Iron Mt. & Southern.....	2,618,486		1,929,094	I.	689,394		35.7		
Net earnings.....	755,827		485,534	I.	270,293		55.7		

Month of June:		1880.		1879.		Inc. or Dec.		P. c.	
Atch. & Charlotte Air Line.....	\$52,602		\$39,185	I.	\$13,417		34.2		

Month of July:		1880.		1879.		Inc. or Dec.		P. c.	
Cleve., Mt. Vernon & Del.....	\$30,681		\$29,370	I.	\$1,302		4.4		
Denver, So. Pk & Pac.....	140,900		70,354	I.	70,546		100.2		
Ind., Bloom. & W.	103,438		88,549	I.	14,889		16.8		
Lake Erie & West.	118,352		49,472	I.	68,880		139.2		
Nash., Chat. & St. L.....	151,504		133,590	I.	18,004		13.5		
N. Y. & New England.....	207,712		189,003	I.	18,709		9.9		

First week in August:		1880.		1879.		Inc. or Dec.		P. c.	
Chi. & Eastern Ill.	\$26,235		\$20,551	I.	\$5,684		27.6		
St. L., Iron Mt. & Southern.....	112,700		101,761	I.	10,939		10.7		

Second week in August:		1880.		1879.		Inc. or Dec.		P. c.	
Denver & R. G.....	\$95,447		\$14,432	I.	\$81,015		561.4		

Week ending Aug. 7:		1880.		1879.		Inc. or Dec.		P. c.	
Grand Trunk.....	\$212,414		\$160,912	I.	\$51,502		32.0		

Coal Movement.

Coal tonnages are reported as follows for the week ending Aug. 7:

		1880.		1879.		Inc. or Dec.		P. c.	
Anthracite.....	409,717		540,716	D.	130,999		24.2		
Semi-bituminous.....	87,044		76,425	I.	10,619		13.9		
Bituminous, Penna.....	33,780		36,444	D.	2,664		7.3		
Coke, Pennsylvania.....	21,955								

An attempt to secure a general increase in list prices of anthracite has been unsuccessful, and charges have been made of cutting prices.

Shipments of coal from Pictou, Nova Scotia, for the seven months ending July 31 were 125,354 tons.

The Southern Railroad War.

The war between the Louisville & Nashville and the Chicago, St. Louis & New Orleans companies continues active, but without change. The cutting has extended to freight rates, which are now very uncertain, not only to New Orleans, but to all points in the disputed territory reached by both lines and their connections.

RAILROAD LAW.

Definition of a Franchise in Illinois.

In the case of the Lake Shore & Michigan Southern and the Chicago, Rock Island & Pacific Railroad Companies, appellants, against the Chicago & Western Indiana Railroad Company, appellees, which was a bill to restrain the Western Indiana from condemning a right of way across the tracks of the appellants near the Sixteenth street crossing, Judge McAllister, of the Illinois Appellate Court in Chicago, recently gave a decision, the point under argument being whether the case involved a franchise or not; if it did, the appeal should have been direct to the Supreme Court and not to the Appellate Court. The opinion is substantially as follows:

In this case the appellants, the Lake Shore & Michigan Southern and the Chicago, Rock Island & Pacific Co., filed a bill in the court below to restrain appellee from proceeding to condemn for its right of way, within the city of Chicago, a portion of appellant's right of way on the ground that the appellee in what it was about to do was acting without, or in excess of its lawful authority, and upon other grounds.

The Court below denied the injunction, and dismissed the bill, from which decree the appeal was taken. On this motion to dismiss that appeal, it is claimed on behalf of appellee, that the case involves a franchise, wherefore this Court has no jurisdiction. As we construe the statute, if a franchise is involved within the meaning of that statute, the position of the appellee's counsel is well taken. What, then,

is meant by the word "franchise" and by the words "is involved" as there employed?

The counsel for the appellee argue that because the bill was brought to restrain appellee from exercising the right of eminent domain, and because the right of eminent domain is a franchise, a franchise is for that reason involved. Perhaps the most extensive sense in which the word "franchise" has been used it might include the right of eminent domain. Blackstone defines a corporation to be a franchise, and each individual of the corporation, he says, is also said to have a franchise or freedom. The word "franchise," in its most extensive sense, is expressive of great political rights, as the right of being tried by a jury, the right a man may have to an office, and the right of suffrage. It is in this sense that the word is applied by Blackstone when defining a corporation, and not in the less general and more appropriate sense of the exclusive exercise of some right, or the sole enjoyment of some profit, as the right to wrecks, or the privilege of a fair or a market.

In the People *ex rel vs.* Holtz, 92 Ill. 426, which was a proceeding by *quo warrant* to try the title to the office of directors of schools, the Court held that an office was not a franchise within the meaning of the constitution and statute prescribing the appellate jurisdiction of the Supreme and Appellate courts. The Court in that case quoted the whole of Blackstone's definition of a franchise, and concluded with these observations: "It will be observed that none of these except corporations having the right to take toll at bridges, wharves, etc., have any application under our laws. If, then, his enumeration is to be taken, the number of cases is small in which a franchise may be involved. If the Constitutional Convention and the General Assembly used the term according with its strict legal import, and we must presume they did, then, in this country, it can only embrace corporations, ferries, bridges, wharves, and the like, where tolls are authorized to be taken; and we may add the elective franchise as it is granted by the constitution to a portion of the people to elect their officers. If others exist they do not occur to us at this time."

This restricted definition clearly excludes from the term "franchise" that right inherent in, or incident to, sovereignty called the right of eminent domain, which, from its nature, could not be classed among the incorporeal hereditaments constituting a "franchise," as that term is understood under our law; because it is a right incapable of enjoyment in and of itself. A corporation vested with it is merely clothed with a power to invoke the aid of the judiciary for the purpose of having a judicial ascertainment of the amount it shall pay before it can appropriate land of individuals for a public use. It is in its exercise but a compulsory sale; and the right to thus invoke the aid of the courts is no more a franchise than that to file a bill for specific performance of a contract.

Nor is the case one in which a franchise is involved as respects the appellant corporation. While it may be one in which a franchise would be indirectly concerned and incidentally affected, yet that would not be within the intent and meaning of the statute requiring an appeal to be taken directly to the Supreme Court. The words employed are not so general, but restricted. They are "in cases in which a franchise is involved." To constitute a case within the true meaning of that phrase there must be such a form of procedure, in a court of such jurisdiction, as that the matter of the legal existence of a franchise is directly brought in question, and may be properly adjudicated in that cause. That would clearly be a case in which a franchise is involved.

The Legislature sometimes expressly authorizes the corporation or individuals to whom franchises are conferred to mortgage them with other property. There might, therefore, be instances of suits brought in which the title to such franchises was directly in question. We are inclined to think that such would be cases in which a franchise was involved within the meaning of the statute defining the appellate jurisdiction of the Supreme and Appellate courts requiring the appeal to be taken to the former.

Again, franchises are subject to the power of eminent domain. Suppose the Legislature should expressly authorize a railroad corporation to take by condemnation the franchises and property of a turnpike or bridge company in the legal enjoyment of tolls. We are inclined to the view that in the proceeding to condemn under our laws, in that case a franchise would be involved, because such proceedings would envelop, cover, and embrace the franchises themselves as an entirety, and its condemnation would amount to an utter extinguishment of such franchises. But the condemnation on behalf of one railroad corporation of a right of way over the tracks of another would be a widely different matter. By the result none of the franchises of the latter would be extinguished or even interfered with, though their value might be more or less affected. Such a proceeding clearly does not involve a franchise within the meaning of the statute under consideration. The motion to dismiss the appeal must therefore be denied.

Heavy Damages Against an English Railroad.

The Manchester *Examiner* of July 20 reports an award of heavy damages to the widow of a man killed on the Lancashire & Yorkshire Railway. It was an action to recover damages for loss sustained by the plaintiff, Mary Jane Hindle, and her children, in consequence of her late husband, William Hindle, being killed on the defendants' line. In the pleadings the damages were laid at £10,000. The defendants denied the negligence, and alleged that there was contributory negligence on the part of the deceased. The plaintiff sued for herself and her five children, the eldest being seven years old and the youngest six months, and if entitled to recover she would be in respect of the pecuniary loss to herself and all the young children, who were undoubtedly dependent on their father's exertions for support. The material question to be determined was the question of liability. The deceased, William Hindle, was a cotton-spinner and manufacturer at Blackburn, and 27 years of age. On the evening of the 6th of February he was at the Rishton Station, the defendants' railway, intending to travel from that place to Blackburn. He arrived at the station at 9:35 o'clock, about which time an express train and a stopping train were due, and it appeared that sometimes one came first and sometimes the other. It was necessary to cross the line to get into the Blackburn train, and after being in the waiting-room a few moments the station-master entered, and in response to an inquiry said the train was coming and they had better cross the line. Accordingly, several persons essayed to cross over, but as the deceased was stepping on to the platform he was struck and killed by the express train which dashed through the station. The night was dark, and the deceased, guided by the light of the lamp on the platform, which was a little to the right of the crossing, stepped off the crossing, and was to some extent thereby impeded in his attempt to get on to the platform. The learned counsel submitted that there was negligence on the part of the defendants in consequence of the station-master's recommendation to cross, the defective communications between Rishton and neighboring stations, and the fact that no warning whatever was given by the driver of the train. The jury found for the plaintiff; damages £2,000 for herself, and £500 for each of her five children; total, £4,500.

THE SCRAP HEAP.

Railroad Equipment Notes.

H. K. Porter & Co., at Pittsburgh, have just shipped the last of an order of narrow-gauge Mogul locomotives to Oregon. They have just finished some locomotives for the iron mines of the Edgar Thomson Steel Co., and are working on narrow-gauge engines for roads in Michigan, Ohio, Virginia and the United States of Colombia; also on orders for logging roads in Pennsylvania, Florida and Michigan.

The Cleveland (O.) Bridge & Car Works are building 150 box cars, to carry 15 tons each, for the New-York, Pennsylvania & Ohio; 20 extra heavy flat cars for the Cleveland Rolling Mill Co., and three street cars for a road in Cleveland.

The Marshall Car & Foundry Co. has its new buildings at Marshall, Tex., nearly ready for use. The foundry is completed and at work on car wheels.

The Tredegar Works, in Richmond, Va., are filling several large orders for freight cars, chiefly for Southern roads.

The Portland Co., at Portland, Me., is building a number of box cars for the European & North American road. They are built to carry 15 tons each.

The Boston Equipment Co. has been organized with \$250,000 capital stock, and will build shops at Canton, O., for the manufacture of cars.

The largest shipment of railroad cars ever made at Wilmington, Del., in one day took place Aug. 14, when 29 cars were sent to the New York, Woodhaven & Rockaway Railroad, of which the Jackson & Sharp Co. shipped 13, Bowers, Dure & Co. ten, and the Harlan & Hollingsworth Co., 6.

It is said that the car works at Huntingdon, Pa., will soon be started up.

The St. Charles (Mo.) Manufacturing Co., manufacturer of cars and wheels, has appointed Mr. O. W. Meyensburg General Agent, with office at No. 509 North Third street, in St. Louis.

Iron and Manufacturing Notes.

Mt. Vernon Furnace, near Ironton, O., went into blast Aug. 14.

The rolling mill of Kimberly, Carnes & Co., at Greenville, Pa., was burned down on the night of Aug. 9. The loss is heavy and only partly covered by insurance.

The Philadelphia Steel Forge Co. made the other day one of the largest ingots of crucible steel ever cast in this country. It weighed upward of 900 lbs., and was in perfect condition.

The iron manufacturing firm of Lewis, Oliver & Phillips has been changed to Oliver Bros. & Phillips, Mr. Wm. Lewis retiring. The new firm is composed of Henry W. Oliver Jr., David B. Oliver, James B. Oliver, John Phillips and James Smith, the latter being a new member. The firm have restarted their upper mill (formerly McKnight's), which has been idle during most of the summer.—*Pittsburgh Manufacturer*.

The Central Pacific Railroad shops in Sacramento, Cal., are to be increased by the building of a large rolling mill.

The Trenton Iron Co., at Trenton, N. J., is now running full, with about 500 men at work. The rolling mill is running double turn, and the wire mill single turn.

A new blast furnace is to be built at Cowan, Tenn., which will be one of the largest south of the Ohio.

Oakdale Furnace, in Roane County, Tenn., which lately went into blast, is running steadily and making 50 tons of iron a day.

The Indianapolis Rolling Mill Co. is re-rolling a large lot of iron rails for the Grand Trunk. The owners of the mill have about decided to put up Bessemer steel works in connection with it, and have bought a large tract of land for that purpose.

Bridge Notes.

The Passaic Rolling Mill Co., at Paterson, N. J., is building an iron bridge over the Savannah River for the Augusta & Knoxville road.

Cofrode & Saylor, of the Philadelphia Bridge Works at Pottstown, Pa., are building nine girder bridges for the West Chester & Philadelphia road; a truss bridge for the New York & New England, and some work for the approaches of the East River Bridge.

The Keystone Bridge Co., of Pittsburgh, is building a bridge 628 ft. long at Catlettsburg, Ky., for the extension of the Chesapeake & Ohio road.

The New Jersey Steel & Iron Co., at Trenton, N. J., is turning out a large quantity of bridge iron for a railroad in Texas.

The Tredegar Works, in Richmond, Va., are building a number of bridges for the Richmond & Allegheny road.

The Phoenix Iron Co., at Trenton, N. J., is making several small light-houses for the Delaware River, and has a large contract for iron roofing for the new public buildings in Philadelphia.

The Atlanta (Ga.) Bridge Works of Wilkins, Post & Co. have taken a contract to build a bridge of two spans, one of 105 and one of 151 ft., to replace a bridge lately burned, over Chattanooga Creek on the Nashville, Chattanooga & St. Louis road.

Prices of Rails.

Steel rails are active and somewhat higher. Quotations vary from \$60 to \$65 per ton at mill. Sales of several thousand tons of English rail at \$63 per ton, delivered in New York, are reported. It is said that some large contracts have also been made for rails to be rolled from imported steel blooms.

Iron rails are active and prices are from \$46 to \$48 per ton at mill. A large order is reported placed for English iron rails at about \$48 per ton, delivered in Galveston or New Orleans.

Old rails are quiet, with sales at \$27 to \$28 per ton in Philadelphia.

Railroad spikes are quoted in Pittsburgh at 2½ cents per pound; track bolts at 3½ cents per pound for square nuts and 4½ for hexagon; fish-plates at 2½ to 2½ cents.

Prices of Scrap Iron.

In Pittsburgh an increasing demand is reported with prices at \$20 to \$22 per ton for cast scrap; \$30 to \$32 for old car-wheels; \$26 to \$28 for No. 1 wrought scrap, and \$33 to \$35 for old car springs and axles.

Government Contracts.

Col. J. N. Macomb, United States Engineers, will receive at his office, No. 1,619 Chestnut street, Philadelphia, until August 26, bids for dredging at the mouth of Duck Creek, Del.; until August 27 for dredging in the Delaware above Bordentown, N. J., and until August 28 for dredging a cut across Smith Island bar, between Philadelphia and Camden, in the Delaware River.

Bids for dredging in Washington Harbor will be received by S. T. Abert, United States Engineers, at the office, No. 1,907 Pennsylvania avenue, Washington, until September 11.

Goats.

A deluded engineer on the New Jersey Central tried to kill a goat at Elizabethtown the other day. He wasn't posted on natural history enough to know the thing couldn't be

done, and he let drive at the goat with an express train. It was no use, and when the train got to Bergen Point that goat was standing calmly on the pilot, all ready to butt at the first man, boy or dog who might come along.

French story: A baggage-master who held in his hand a bundle done up in a bandanna handkerchief addressed a peasant, the owner of the bundle, with, "Say, Mister, where is this package going? Don't you see there is no address on it?" "Going!" was the reply, "Why, it's going home, to be sure, and I want you to send it at once." "Yes, but where is the address?" persisted the man of affairs. "Oh, there is no need of any address, mother will know it the moment she sees that handkerchief."

Some railroad men are credited with a great command of language, but they can't pretend to equal the ancient mariner in that respect. Take, for instance, the following, reported by the veracious *Hawkeye* man on his travels:

"It was on a Sound boat, and the mate was evidently annoyed about something. 'Carry it forward,' he roared. 'Carry it forward, you lunkheaded son of a sculpin, or I hope to be gee whizzley gaul dusted to Jude if I don't maul the dad slammed head off'n ye with a capstan bar, you hog-backed molligrubber, ye!' And the deck-hand looked up in profound admiration and said: 'By George, Cap, if I had your culcher I wouldn't be a rummin' as mate for no man in these waters; I'd be a commandin' a boat of my own.'"

When an up-country conductor struck in the smoking car a boy puffing a big cigar, and the lad tendered him a half-fare ticket, it rather took the railroad man's breath away.—*Boston Post*.

A Brave Fireman.

The Altoona (Pa.) *Tribune* of Aug. 14 tells this story: "The fireman on engine No. 817, which is a modoc and runs on the Pittsburgh Division, has proved himself a hero and worthy of the place he holds. Before daylight one morning this week he performed a deed which old railroad men say was one of the bravest ever executed on the mountain. The train was coming toward Altoona from Gallitzin, and when near the latter station the rear end of the train parted, leaving the conductor and all the brakemen but one on it. The break was not noticed on the engine, and the train ran on through the tunnel. While still in there 23 cars broke from the rear end of what was left and came spinning along without a brakeman on them. The brakeman on the front section, when they slackened up saw that a collision on the heavy down grade was inevitable, and he and the engineer both jumped to save themselves. Then it was that the true qualities of the fireman were displayed. He sprang to the vacant seat, opened the throttle and started down the mountain. In a moment the collision came, but its force was so weakened that nothing was broken. He was the only man on a train of 33 cars running rapidly down the heavy grade. It took but a short time to reverse the engine and apply the brake. Then back on the cars he climbed and put on the brakes. It was a three-mile run before he succeeded in getting them stopped, but by his nerve he saved a tremendous freight wreck, as had the cars got a start they would have every one landed in the ditch at the Horse Shoe Curve, if not sooner."

Dead on his Locomotive.

Engineer Kern died suddenly on his engine about 10 o'clock Thursday night, between Gilson and Knoxville, while running from Peoria to Galesburg. He failed to whistle for the station (Knoxville), but was leaning out of the cab window, and not answering to a question, the fireman took hold of him and drew him inside, when he gave a single gasp and expired. A doctor summoned at Knoxville pronounced the cause rheumatism of the heart. Mr. Kern was a brother of Mrs. J. C. Porter, of this city, had been on the Chicago, Burlington & Quincy road many years, and leaves a wife and three children to mourn his loss. Mr. and Mrs. Porter were summoned to Galesburg yesterday morning by telegram.—*Aurora (Ill.) Beacon*, Aug. 12.

An Impostor.

Mr. J. Waldo, General Freight and Passenger Agent of the Houston & Texas Central Railroad, has issued the following circular:

"I am advised that a person calling himself C. B. or C. H. Cole has been representing himself as an agent of this company, and by that means has obtained favors of various descriptions. This company has not, and never did have an agent named Cole employed in any capacity, and I would advise all to whom such person may apply, making such representations, to treat him as an impostor."

Narrow-Gauge Misinformation.

The following paragraph had a general run sometime ago, and has just been revived and started on the rounds again:

"One of the most curious railroads in the world is the 10-in. gauge road running from North Billerica, Mass., to Bedford. It was at first bootied at by the people, but the road was completed, making a length of about 8½ miles. There are eleven bridges on the road, one of which is over 100 ft. long. The rails weigh 25 lbs. to the yard. The road is well built and equipped—one grade is 155 ft. The cars and engines will at first sight create wonder and admiration. Their perfect proportions give them a handsome appearance. They are constructed very near the ground, giving them great advantages of safety. The cars have an aisle with one seat on each side, in the same manner as ordinary cars have two seats. The length of the cars allow 30 seats, each person having a seat to himself. The cars are supplied with closets, water tank, are heated by steam and have all the modern improvements. They weigh but 4½ tons, ordinary cars weighing on an average 18 tons. The trains run at the rate of 20 miles an hour with perfect safety. The engine is placed behind the tender, giving it greater adhesion to the track. They weigh eight tons, and draw two passenger and two baggage cars. The cost of the road was about \$4,500 per mile."

The facts are that the road was of 24 in. and not of 10 in. gauge. It was completed, but trains never ran regularly. The company went into bankruptcy, the road was sold, the rails taken up, and both rails and equipment are now in use on the Sandy River road in Maine, which is also of 24-in. gauge.

Iron Exhibits at Dusseldorf.

An industrial exposition is being held at Dusseldorf, at which some notable metallurgical products are shown. One firm (Piedboeuf) shows a plate 8 ft. 4 in. wide by 11 ft. 7 in. long; and gasket plates in 21 thicknesses of which 150 holes are punched at once by a hydraulic punch, the thickness being about 1-5 inch. An iron pipe 82 ft. long is bent into a spiral only 40 in. high. The Dortmund Union Works show scaffolds of giant beams 20 metres long, 40 centimetres high and 16 millimetres thick (65 ft. 7 in. × 16 in. × ⅝ in.), weighing 3,695 lbs. There is another beam 39 ft. 4 in. long and 20 in. high, a Bessemer rail 170 ft. 7 in. long, another rail 124 ft. 8 in. long, and a girder 150 ft. 11 in. long. A pump rod is 54 ft. 2 in. long, and weighs nearly three tons. Among the plates is one 36 ft. long and 1.42 in. thick, weighing 6,963 lbs.; one 11 ft. 6 in. × 32 ft. 11 in. × 1.38 in.; one shown by the Phoenix Works, of Laar, 23 ft. × 8 ft. 8 in. × 1-2-3 in.; and another by the same works 23 ft. 11 in. × 5 ft. 1 in. × 0.43 in., with its corner folded over like a sheet of paper.

There is a round iron exhibited which is 219 ft. 10 in. long and $\frac{3}{8}$ in. in diameter. A steel plate 40 x 20 in. is only 0.1 millimeter, or 0.004 in. thick.

Changing Fairlie Double-Boiler to Single-Boiler Locomotives.

A correspondent of the *English Mechanic*, writing from New Zealand May 21, says:

"As an appendix to my letter, No. 16,892 (Vol. XXX., p. 579), on Fairlie engines, written in reply to Mr. Fairlie's criticism of my former letter, I may add that my remarks as to the preference existing in New Zealand for his single-boiler engines over the double-boilers have since received a striking illustration. During the last two months I have been making a long tour of the New Zealand railways, and have traveled on several of the Fairlie engines of different classes. I find the general verdict is exactly as I gave it in my previous letters. But this is not the striking evidence to which I alluded above.

"In Dempsey & Clark's work, 'The Locomotive Engine,' on p. 149, will be found an illustration of a 'double-boiler, double-bogie, Fairlie engine, 3 ft. 6 in. gauge, for the Dunedin & Port Chalmers Railway, New Zealand.' That engine was one of two specially imported to work the line. They were named 'Rose' and 'Josephine,' and are classed as 'B' in the New Zealand locomotive class list. They have 10-in. cylinders (4) and 3 ft. 9 in. driving-wheels (8). When I was in Dunedin last month, I found these two unhappy engines undergoing the painful operation of being cut in two. In plain terms, they are being converted into single-boiler Fairlies. Each engine is being severed in two, the fire-box being left attached to one of the boilers, while a new fire-box is being constructed for the other boiler. Tanks and coal-bunkers are being added, placed on a four-wheeled trailing bogie, and the engine thus will be, to all intents and purposes, a single Fairlie, the two double engines developing into four single ones. The alteration has been made by the Railway Commissioner (Mr. W. Conyers, C. E.), who believes the converted engines will be admirably adapted for passenger traffic, whereas, hitherto they have proved expensive and apt to get out of repair. The passenger trains were too light for the double engines, but the latter would not take heavy goods trains so well or economically as the handier six-wheel coupled ordinary locomotives of the 'F' class, which were far cheaper workers. Hence the change. This I think may fairly be regarded as a strong practical testimony in favor of my view.

"The imported single-boiler Fairlies continue to do excellent work, and some locomotive superintendents, who at first disliked them, now cordially recognize their efficiency. I may mention that in comparing two fast runs, one with a single Fairlie and the other with an American express engine, over similar roads, the Fairlie was greatly the easier and steadier of the two in traveling. I was on the foot-plate in both cases, and took careful observations. The Fairlie had 16 coupled wheels, 3 ft. diameter, rigid wheel base only 6 ft. 6 in., cylinders 12 by 16, and trailing four-wheel bogie. The American had four coupled wheels, 4 ft. diameter, cylinders 12 by 20, leading and trailing two-wheel bogies, and tender on two four-wheel bogies. The Fairlie ran at a speed of 52.9 miles per hour, and the American at 50.7 miles an hour. Both engines behaved admirably, but there could be no doubt as to the superior steadiness of the Fairlie, although she was traveling slightly faster than the American engine."

Wanted a Pass.

A prominent railroad official was stopped on the street Monday by a feely-looking individual, with an injured look and a green umbrella.

The railroad man was in a hurry.

The S. I. wasn't. He wanted to be confidential. He took the railroad man by the vest button, drew him into the shadow of a convenient hall-way and remarked:

"You couldn't guess what I want, could you?"

The railroad man said his guessing education had been sadly neglected and frankly confessed that he couldn't.

"Now," continued the S. I., "you needn't be in any hurry about this matter, I can wait an hour or so. I—"

"But, my friend, I can't," chimed in the railroad man. "I've got business to attend to. Tell me what you want, and make your story short."

The S. I. said he would, and blurted it right out: "I want a pass from here to Cincinnati and return."

"On what grounds?" queried the railroad man.

"Well," replied the S. I., "I'm financially wrecked, and need it."

The railroad man reached for his tormentor, but he wasn't there. He'd passed—out.—*Keokuk Gate City.*

OLD AND NEW ROADS.

Atchison, Topeka & Santa Fe.—Track on this road is now laid to Socorro, N. M., 75 miles southward down the Rio Grande Valley from Albuquerque, and 977 miles from Atchison. Work is progressing steadily towards El Paso.

Boston & Albany.—After next month the passenger engines on this road will run through between Boston and Springfield, instead of changing at Worcester as heretofore. The round trip is 196 miles, and it is intended to have each engineer and fireman make the run four days in the week and lay off two. As there are eight through trains each way, the work will require 12 engines and crews, while under the present system 16 are in use, eight running between Boston and Worcester and eight between Worcester and Springfield.

Burlington, Cedar Rapids & Northern.—The grading is now in progress on the extension of this company's Muscatine Division from What Cheer, Ia., northward to Montezuma, about 15 miles. Track-laying will be begun very soon.

Cairo & Vincennes.—A dispatch from Springfield, Ill., Aug. 10, says: "To-day all of the innumerable intervening petitions in the case of Winslow against this company were disposed of, a number being dismissed. The Receivers were directed to pay the judgment of \$900 in favor of J. W. Drexel, and to borrow the money to pay the judgments of Green B. Baum and James Mitchell, about \$18,000, and \$65,000 to J. S. Morgan & Co., New York. The Receivers, J. W. Drexel and C. E. Tracey, filed a petition asking to be discharged, in which they show that a plan for reorganization has been agreed upon, the new company to issue \$3,500,000 of bonds and \$1,700,000 of preferred stock, and provide for the Receivers' indebtedness. An order was accordingly entered discharging the Receivers, approving the plan of reorganization and directing them to deliver the property to the new company."

Canadian Pacific.—The *St. Paul Pioneer Press* says: "Mr. John Shields gives some interesting particulars of the progress of the construction on the Thunder Bay & Selkirk Division of the Canada Pacific Railroad. The work undertaken by Mr. Shields's company is a stretch of 68 miles from Rat Portage to Eagle Lake, part of the missing link, and connects with the Purcell & Ryan contract on the east and the Whitehead section on the west. Mr. Shields' firm are pushing the work as rapidly as circumstances will allow. They have now 1,500 men at work,

and expect shortly to increase the force to 2,000 at which figure it is proposed to keep it till the work is finished. Since the first of June the firm has been paying \$1.75 per day, and proportionately higher rates to skilled workmen. Purcell & Ryan have nearly a thousand men at work upon the section, and Mr. Heney, the Superintendent who is in charge of the Whitehead contract in behalf of the government, has some 300 men and five steam shovels employed. Purcell & Ryan's section is now completed to Ignace, and it is expected that track will be laid by November to Tache station, 20 miles or so farther on. From this point communication is possible by lake and portage transit to the east end of Manning & Co.'s contract, and Mr. Shields will then be able to forward supplies by way of Prince Arthur's Landing, instead of taking them around by Winnipeg, as now has to be done. This change, it is needless to say, will much improve the condition of Mr. Shields' company by relieving them of an enormous charge for freight. They have now two steam shovels at work, and next season expect to have seven. On the Whitehead contract rails will be laid this winter, and Mr. Shields' belief is that all the contracts will be finished and the road opened within a specified time. The country traversed by the road Mr. Shields believes to be rich in minerals, but considers it to be useless for any other purpose, as it is merely an alternation of rock and marsh. As an evidence of the mineral wealth of the country, Mr. Shields mentions that an extensive and valuable discovery of coal has just been made at Lake of the Woods."

Camden & Atlantic.—In connection with the Central Railroad, of New Jersey, this company has opened a through line between Atlantic City and New York. The route is over this road to Winslow Junction, thence by the New Jersey Southern to Long Branch and over the Central to New York.

Chesapeake & Ohio.—Work is now well advanced on the extension of 20 miles down the Ohio River from Huntington, W. Va., to Ashland, Ky., and it will probably be finished by October. The expectation is to make connection at Ashland with the Lexington & Big Sandy road on the south side of the Ohio, and the extension of the Scioto Valley road on the north side of the river. Both these lines are now in progress.

It is stated that the company has now under consideration the early commencement of work on the extension from Richmond to deep water on Chesapeake Bay, and that the bay terminus will soon be decided on. West Point, Yorktown and Newport News have all been under consideration, it is said.

In this connection there is a revival of the old plan of an extension of the Eastern Shore lines to Cherrystone and a connection across Chesapeake Bay to the bay terminus to be chosen for this road, making a line to New York by way of the Delaware Railroad, Wilmington and Philadelphia. Part of this talk may be due to the fact that officers of this company have lately been taking a trip over the Delaware road and down the Eastern Shore.

Chicago & Alton.—A bill has been filed by the Massachusetts Life Insurance Company in the United States Circuit Court in Chicago to set aside the sale by which this company acquired possession of the Chicago & Illinois River road. The bill is very long; it sets forth the history of the road sought to be recovered and asks the Court to set aside the judgment by confession and sale under the creditor's bill to Straut or the Chicago & Alton. Also, that the Chicago & Alton may be declared to be a trustee for the road since May 7, 1875, and held to account for its property and affairs since then. That a new trustee may be appointed under the Straut deed. That a pretended sale of 474 of the secured bonds to one John Slater in 1875 by Jesup, Paton & Co. may be set aside, and that if the sale of the railroad property to the Alton is not confirmed, that it be decreed that that company be required to cancel those bonds and has forfeited its right to and security on those bonds. That thereupon complainant's bonds may be declared a first lien on the Illinois River road and the 1,400 acres of coal lands. That an assessment of the responsible stockholders of the Illinois River Company be made, and finally that a receiver may be appointed for that road.

Chicago & Eastern Illinois.—Track is now being laid on the Grape Creek Branch, which is to extend from Danville Junction southwest to Grape Creek, six miles. It will reach some deposits of coal very much like the Indiana block coal. It has been built by a nominally separate corporation, but is really owned and will be worked by this company. Mr. J. B. Brown, of Chicago, is the contractor.

Chicago & Northwestern.—Surveys are being made for a new branch of the Peninsular Division to start from the main line at a point between Ford River and Bark River and run northwest into the Felch Mountain Iron Range. The line will be nearly parallel with the Menominee River road and from 12 to 15 miles north of that branch.

Chicago & Western Indiana.—In the matter of the appeal of this company from the Appellate Court, the Illinois Supreme Court has reversed the decision of the lower court and holds that the suit does involve a franchise. Consequently the Appellate Court had no jurisdiction in the case, but the appeal should have been taken direct to the Supreme Court. This sends the case back again to the Circuit Court.

Cincinnati, Sandusky & Cleveland.—The Boston Transcript of Aug. 11 reports: "Cincinnati, Sandusky & Cleveland Railroad stock declined from 15 $\frac{1}{4}$ yesterday to 14 $\frac{1}{4}$. This is a half stock, and 15, it should be remembered, equals 30 per cent. of par, or \$30 as stocks are ordinarily sold. Representatives of this company and of the Cleveland, Columbus, Cincinnati & Indianapolis Company met in Saratoga yesterday to discuss the lease question. The latter offered to lease the Sandusky road, guaranteeing 1 per cent. dividends upon the stock. As the stock is earning about 2 per cent. this was declined. If 3 per cent. were offered, it would probably be accepted; but the probabilities are in favor of a lease upon a sliding-scale guarantee."

Coast Line.—It is stated that this company has succeeded in negotiating a sale of its bonds to an amount sufficient to build the road from Columbia, Tex., to Wharton, about 40 miles. Iron has been bought, and is now on the way to Texas.

Decatur & Mobile.—It is said that a company will be formed soon to build a railroad from Decatur, Ala., on the Tennessee River, southwest to a connection with the Mobile & Ohio. Surveys are reported in progress to determine the best line, and also the point where connection will be made, which will probably be either at Columbus or Aberdeen on the Tombigbee River. Each of these towns is the terminus of a branch of the Mobile & Ohio; Columbus being about 120 and Aberdeen 110 miles from Decatur, through a country now without a railroad.

Detroit, Hillsdale & Southwestern.—This company is considering the question of building an extension from Bankers, Mich., west by south to Lagrange, Ind., on the Grand Rapids & Indiana road, a little over 40 miles. The plan also includes a further extension of about 55 miles,

from Lagrange to Walkerton on the Chicago Division of the Baltimore & Ohio. The building of the new line depends somewhat upon the amount of local aid that can be secured.

Greenville & Columbia.—The question as to which was the last legal bid received for this road at the foreclosure sale has been under argument before the Circuit Court at Columbia, S. C., for nearly a week past. It will be remembered that the road was bid off for \$2,393,600, when the Master reopened the sale and it was finally bought for \$2,963,400 by the same parties who made the lower bid. They now claim that the reopening was irregular, and that their lower bid was the last legal bid made.

Guatemala.—A letter from Panama, Aug. 5, says: "A contract has been signed in Guatemala for the extension of the San Jose & Escuintla Railroad to the capital, a distance of about 45 miles. The contractors are William Nanne and Louis Schlessinger, who have just successfully completed the section referred to, which runs from the principal port of the republic to Escuintla, a distance of 33 miles. The contractors represent a California company, and have abundant means to accomplish their present contract, which they can easily do in 18 months."

Hudson Tunnel Railroad.—The reopening of the tunnel works and the recovery of the bodies of the men killed there seems to be as far off as ever. The coffer dam plan has been abandoned and a new caisson is to be built, the engineers having returned to the compressed air system of working.

Juniata & Cumberland Valley.—It is proposed to build a railroad from Mt. Union, Pa., on the Pennsylvania Railroad's main line and the Juniata River, southeast to Shippensburg on the Cumberland Valley road. The distance is 42 miles, and a large part of the line is through a coal producing country.

Manhattan Elevated.—The Second Avenue line, the Metropolitan Elevated East Side line in New York, is now completed to One Hundred and Twenty-seventh street, Harlem, a little over three miles north of Sixty-fifth street, which has been the terminus for several months. Regular trains began running to Harlem Aug. 16. The new line is parallel to the Third Avenue line and will, it is said, be run rather as a through line to relieve the other, which will take the way business.

Midland North Carolina.—This company, which is one of the applicants for a lease of the Atlantic & North Carolina road, offers to extend that line by building a road from its present terminus at Goldsboro, N. C., west by south to Fayetteville on the Cape Fear & Yadkin Valley road. Its purpose is, by an agreement with that company, to make a line from the sea at Morehead City to Greensboro and the hill country of Northwestern North Carolina.

Mineral Valley.—This company has filed articles of incorporation in Ohio to build an extension of the Conotton Valley road from Dell Roy, O., westward to Zoar, in Tuscarawas County, a distance of about 18 miles. The capital stock is fixed at \$150,000.

Missouri Pacific.—A dispatch of Aug. 12 from Jefferson City, Mo., says: "Papers showing the consolidation of the following roads with the Missouri Pacific were filed in the Secretary of State's office to-day: St. Louis & Lexington, Kansas City & Eastern, St. Louis, Kansas & Arizona, Missouri River and Leavenworth, Atchison & Northwestern. The capital of the consolidated company is fixed at \$30,000,000."

Morgan's Louisiana & Texas.—Contracts have been let for the grading of the extension of the Opelousas Branch from Opelousas, La., northward to Alexandria on Red River. The company has already contracted for the rails for this extension.

New Bonds.—More new issues of bonds offered for sale are noted as follows:

Ohio & West Virginia first-mortgage bonds are offered by Widslow, Lanier & Co., of New York, at 101 and interest. The road is completed from Logan, O., to Gallipolis, 64 miles, and a branch about 20 miles long is to be built to Pomeroy. The road is owned by the same parties who control the Columbus & Toledo and the Columbus & Hocking Valley, and will be worked as an extension of the last-named line.

New Orleans Pacific.—The American Railway Improvement Company receives at its office in New York until Aug. 21 bids for \$2,000,000 of the 6 per cent. first-mortgage bonds of this company. The terms are 10 per cent. on allotment and the balance as called for in 10 per cent. installments, not less than 30 days to intervene between the calls. A bonus of 50 per cent. in stock will be given with the bonds.

New York & Brooklyn Elevated.—This company has completed and filed a map of its proposed elevated road in Brooklyn, N. Y., which is to extend from Fulton Ferry to Prospect Park, with a branch to Greenwood Cemetery and New Lots, and another branch to the East River Bridge, and across it to New York.

New York Central & Hudson River.—The London statement of this company's earnings for July and the ten months of its fiscal year ending July 31 is as follows:

	July	1879	1878-79	1877-78
Earnings.....	\$2,863,000	\$2,195,000	\$27,152,000	\$22,928,000
Expenses.....	1,604,000	1,229,000	15,206,000	12,840,000
Net earnings.....	\$1,259,000	\$966,000	\$11,946,000	\$10,088,000

This shows an increase in net earnings of 30.3 per cent. for July, and of 18.4 per cent. for the ten months, which is precisely the same as the increase in gross earnings, and the latter are without doubt estimated, as we showed a month ago, when they were certainly wrong. It is too early to ascertain July expenses. The net earnings are doubtless larger than reported above.

New York, Lake Erie & Western.—An additional section of second track has been completed on the Buffalo Division, extending from Canaseraga to Nunda, 12 miles.

New York & New England.—This company has let a contract to Henry Wheeler, of Middlebury, Conn., for 220,000 ties, of which about 120,000 are to be delivered at once for the extension from Waterbury, Conn., to Brewsters, N. Y., and the balance in the fall on the lines from Brewsters to the Hudson River.

Ogdensburg & Lake Champlain.—The round-house of this company at Ogdensburg, N. Y., was destroyed by fire early on the morning of Aug. 16, and five locomotives, which were in it at the time, were badly damaged, two of them being considered beyond repair. The loss is estimated at \$75,000, and is about two-thirds covered by insurance. The fire is supposed to have been caused by sparks lodging in a tender full of wood, which had come in the night before.

Oregon Railroad & Navigation.—A letter from Portland, Oregon, Aug. 3, says: "The work of grading the line of the Oregon Railroad & Navigation Company's road

Per cent. of expenses to earnings, excluding taxes.....	46.15	50.41
Per cent. of expenses to earnings, including taxes.....	48.50	52.60

Thus an increase of \$2,768,428, or 19 per cent., in gross earnings was made, with an increase of \$816,600, or 107 per cent., in working expenses.

Gross earnings, working expenses and net earnings compared as follows:

	1879-80.	1878-79	Increase.	P. c.
Gross earnings..	\$17,349,349.04	\$14,580,921.30	\$2,768,427.74	19.0
Working ex- penses.....	8,431,599.82	7,707,649.13	816,608.97	10.7

Net earnings.... \$8,917,749.22 \$6,873,272.20 \$2,044,476.96 29.8

Thus, with the slight increase of 4 1/2 per cent. in mileage worked, there has been the very large increase of nearly 30 per cent. in the profits.

The disposition of net earnings was as follows:

Interest on bonds.....	\$3,322,015.68
Rents of leased roads.....	1,381,690.65
Dividends.....	1,956,046.00
Sinking funds.....	98,120.00
Total.....	\$6,757,842.33
Credit balance.....	\$2,159,906.89

Net earnings..... \$8,917,749.22

Though 6 per cent. was paid on the common stock during the year, only 3 per cent. of it was from the earnings of that fiscal year, the first dividend being from the surplus of the preceding year. The preferred stock is entitled to 7 per cent. out of the net earnings of a year before anything is paid upon the common, and until enough is actually on hand in the treasury to meet the preferred dividend, nothing is paid on the common.

The surplus of net earnings over interest, rentals and sinking fund payments last year was \$4,214,073, which is equivalent to 11 1/2 per cent. on both common and preferred stock—against 6 1/2 per cent. last year—7 per cent. on the preferred and 5 1/2 upon the common.

The following is from the report of Mr. Albert Keep, the President of the company:

CONSTRUCTION.

"Included under this head are 403 3/4 miles of new side tracks, laid during the year, at a cost of \$210,921.34; cost of extension to Appleton Water Power, \$58,066.15; extension to Kaukauna Water Power, \$21,500; extension of tracks to iron mines on Peninsula Division, \$7,638.68; new ore dock at Escanaba, \$183,764.05; right of way and depot grounds, \$212,962.09; construction of buildings, \$81,150.29; on account of new shops at West Chicago, \$14,074.81; on account of new passenger depot at Chicago, \$24,721.29; lining and arching tunnels Nos. 2 and 3 on Madison Division, \$23,872.04; permanent bridging, \$166,325.60; fencing, gates and new crossings, \$5,355.26; construction of new telegraph on Sac City Extension, and on Des Moines & Minneapolis line, \$609.82; and for discount on securities applied to construction, \$15,228.63. Total amount for Chicago & Northwestern Railway, \$1,004,771.61.

"The value of the company's property was further increased by the expenditure of \$606,368.85 for new equipment during the year.

PROPRIETARY ROADS.

"On the Winona & St. Peter Railroad and branches, there was expended for right of way, original fencing, new buildings and side tracks, the sum of \$74,871.49. On the Iowa Midland Railway \$42,884.82, for right of way, new side-tracks, grading, etc., and on the Northwestern Union Railway, \$81,137.30, for construction, new side-track, grading Milwaukee depot grounds, and for right of way. Total amount, \$198,893.61.

"Among the items of construction will be noticed the new passenger station in Chicago, which was begun in the spring, and will be finished during the present year. Its location on the site of the old Galena depot and on adjoining lots, is most central and convenient for city travel, and will enable the company to concentrate its trains at one point for its northern, northwestern and western business. The want of this accommodation has long been felt both by the company and the traveling public.

"An important extension, organized as the Toledo & Northwestern Railway, is in progress in Iowa. It joins the main line of this company at Tama Station, Tama County, running through the town of Toledo—whence it takes its name—and pursues a northerly and westerly course through one of the most productive districts in that state; its construction will prevent the diversion to other roads of traffic which we now enjoy, and will secure a large accession of new business for the main lines of the company to Chicago, a distance of 270 miles.

"A permanent lease of the Des Moines & Minneapolis narrow-gauge railroad, extending from the city of Des Moines to Calanan, in Hamilton County, Iowa, and intersecting the main line of this company at Ames, was entered into during the year. The gauge has since been widened for that part of the road between Ames and Des Moines, giving to this company a continuous standard-gauge line to the capital of the state. The length of the entire road is 58 miles.

"The acquisition of this road has especial importance, in the fact that it reaches the region of the extensive coal fields of Iowa, and with the Toledo & Northwestern Railway and its connections forms a direct line for the transportation of excellent coal, by the shortest and cheapest route to Minnesota and Dakota, and for supplying the company with fuel for the operation of its Winona & St. Peter Railroad and extensions.

"The Sheboygan & Western Railway, formerly called the Sheboygan & Fond du Lac Railroad, consisting of about 80 miles of railroad, extending from Sheboygan to Princeton, Green County, Wisconsin, was also added during the year; the permanent union of this road with the Chicago & Northwestern secures to each better facilities for the business of this section of the state, and will confer future advantages, resulting from the improvement and working of the property.

"A short line of 6 1/2 miles, called the Rock River Railroad, is being built between Janesville and Afton, that will promote the business of the Rock River Valley, and effect a saving of time and distance in the transfer of cars between the old Wisconsin, Madison and Galena divisions.

"The company has acquired the Galena & Southern Wisconsin and the Chicago & Tomah railroads, now constructed with a narrow gauge for a distance of 92 miles between Galena, Ill., and Woodman, Wis., with branches to Platteville and Lancaster. An extension of the Chicago & Tomah line will be constructed with a standard gauge direct to Madison, where it will connect with the main line to Chicago, and with the proposed Madison & Milwaukee line to Milwaukee.

"The extension which is being constructed toward the Black Hills, to a point near Fort Pierre, on the Missouri River, is making rapid progress. The road leaves the main line of the Winona & St. Peter Railroad, at Tracy Station, Lyon County, Minn., and is projected in a very direct westerly course across the territory of Dakota, with lateral branches. That portion of the line in Minnesota, consisting of 46 miles of well-built steel-track railroad, fully equipped, extending from Tracy to the Dakota boundary, is called the Chicago & Dakota Railroad; and that portion of the line lying in Dakota takes the name of the Dakota Central Railroad.

"The length of the extension to the Missouri River will be about 250 miles, and up to the date of this report 170

LOCOMOTIVE RETURNS, APRIL, 1880.

Master Mechanics of all American railroads are invited to send us their monthly returns for this table.

NAME OF ROAD.	Number of miles operated.	Number of locomotives in service.	MILEAGE.		MILES RUN TO		Average No. of freight cars hauled.	Average cost per freight car per mile, cents.	COST PER MILE IN CENTS FOR						AVERAGE COST OF	
			Total.	Average per engine.	Coal.	Oil.			Repairs.	Fuel.	Stores.	Miscellaneous.	Engineers, firemen and wipers.	Total.	Coal per ton.	Wood per cord.
Allegheny Valley, River Division*.	130	41	79,523	1,939	30.39	92.24	21.90	0.743	3.56	3.46	0.47	0.47	6.47	13.96		
Low Grade Div.*.	130	18	39,565	2,198	27.60	15.75	22.10	1.341	11.09	3.76	0.72	0.36	6.33	21.90	7.00	4.50
Central Pacific, Western Div.*.	260	90	67,328	2,322	53.64	19.75			5.02	13.03	0.43	0.36	7.50	26.34	7.00	4.50
Northern & San Pablo Div.*.	104	29	72,711	2,507	49.69	21.73			7.16	11.06	0.41	0.37	7.41	39.41	7.00	4.50
Visalia Div.*.	157	12	27,972	2,331	35.55	19.91			5.22	16.68	0.42	0.09	6.54	31.95	7.00	4.50
Tulare Div.*.	170	15	51,309	2,131	34.48	15.40			10.57	20.28	0.56	0.30	8.00	42.41	7.00	4.50
Los Angeles, San Diego, Yuma & Wilmington Div.*.	693	36	103,360	2,871	47.65	17.15			2.92	14.68	0.50	0.19	6.85	25.11	7.00	4.50
California Pacific Div.*.	179	15	29,547	1,770	52.88	29.04			2.73	13.20	0.33	0.97	6.92	24.15	7.00	4.50
Stockton & Copperopolis.	49	3	5,288	2,644	51.93	29.33			1.41	13.44	0.28	0.36	6.54	23.03	7.00	4.50
Sacramento Div.*.	119	30	104,351	2,675	29.91	23.04			3.36	15.04	0.37	0.34	9.29	28.40	4.00	
Oregon Div.*.	151	7	20,484	3,867	49.02	31.97			1.04	9.01	0.29	0.12	6.87	17.33		
Truckee Div.*.	205	27	67,866	2,514	37.83	33.35			5.98	16.15	0.40	0.32	7.93	30.66	7.00	4.50
Humboldt Div.*.	201	2	51,224	2,561	44.96	22.35			4.75	15.65	0.40	0.37	7.59	30.66	7.00	4.50
Salt Lake Div.*.	219	27	70,232	2,823	31.91	19.48			4.94	21.95	0.45	0.23	7.37	34.94	7.00	4.50
Chicago & Eastern Illinois.	153	24	85,056	3,145	31.09	18.40	99.00		2.41	4.61	0.38		5.41	12.21		
Cin., Ind., St. Louis & Chicago.	225	47	115,435	2,540	39.92	29.51			4.16	6.00	0.24		5.56	16.18		
Cin. LaFayette & Chicago.	75	10	28,617	2,862	30.90	14.56			2.28	6.78	0.30		5.89	15.35		
Cleve., Col., Cin. & Ind.	472	10	387,819	40.60		26.50			3.07	0.93	0.55		6.09	16.24	1.40	2.90
Cleveland & Pittsburgh*.	225	83	183,411	2,210	42.79	19.70	17.60	0.916	4.01	3.46	0.48	2.27	6.47	16.87	1.40	2.90
Cleveland, Tus. Valley & Wheeling.	158	18	51,695	2,872	29.68	17.71			5.64	2.27	0.48		5.72	12.11	0.81	2.60
Del., Lacka. & Western, Bloomsburg Div.*.	80	23	65,709	2,857		29.76			2.44		0.51		4.64	7.59		
Erie & Pittsburgh*.	98	29	68,911	2,376	41.41	17.93	16.70	0.745	2.58	4.51	0.52	1.53	6.58	15.72	1.87	1.67
Grand Rapids & Indiana.	332	40	121,736	3,043	40.55	33.13	16.33		3.25	8.10	0.48	2.09	5.65	19.58	3.40	2.50
Green Bay & Minnesota.	249	10	36,439	2,777	48.76	29.73	16.90		3.57	7.50	0.31	0.01	4.74	15.93	4.10	1.90
Houston & Texas Central*.	512	63	189,419	2,911	46.00	32.00	14.90		4.92	6.98	0.41	0.90	6.01	19.81	3.05	2.46
Illinois Central, Chicago Div.*.	395	69	212,320	2,273	35.61	16.34	20.68		4.92	4.21	0.29		5.76	15.18	1.40	3.75
Midland Div.*.	80	10	15,111	1,518	44.52	18.56	7.07		0.96	3.21	0.23		4.77	9.17	1.40	3.75
Northwestern Div.*.	113	10	36,266	2,677	36.71	18.42	18.84		4.50	4.08	0.29		5.63	14.60	1.40	3.75
Springfield Div.*.	113	10	36,266	2,677	36.71	20.21	14.29		3.16	3.58	0.29		4.45	11.49	1.25	2.90
Iowa Div.*.	401	42	104,160	2,481	33.53	18.66	11.65		4.15	6.28	0.27		5.76	16.46	2.60	5.25
Jeffersonville, Madison & Ind*.	229	42	91,713	2,194	44.16	14.55	23.76	0.700	1.60	5.79	0.38	1.74	6.16	15.67	2.35	2.20
Lake Shore & Michigan Southern.	347	38	194,198	2,741	44.70	22.89	20.20		4.10	6.40	0.40		6.80	17.50	2.70	3.70
Buffalo Div.*.	84	17	70,737	2,139	35.19	40.16	23.76		3.61	7.58	0.39		6.33	17.86	2.60	5.60
Erie Div.*.	117	25	175,718	2,177	34.49	27.31			4.06	6.82	0.29		5.99	17.16	2.37	5.43
Toledo Div.*.	80	17	187,514	2,104	24.59	38.91	18.70		4.93	10.54	0.28		6.10	21.98	2.67	4.08
Mich. Southern Div.*.	207	46	478,976	2,313	31.65	23.42			4.07	8.79	0.36		5.87	18.95	3.10	4.63
Little Rock, Miss. River & Texas.	362	61	112,594	1,976	29.63	14.73	16.93	1.229	4.62	6.93	0.31	1.40	6.88	18.54	1.94	2.30
Louisville & Nashville, First Div.*.	200	35	68,070	2,272	32.32	16.73	13.90	0.919	6.09	5.30	0.23	1.45	6.02	16.59	1.81	2.50
Memphis Div.*.	131	16	38,477	2,332	38.17	16.73	14.99	1.340	5.29	6.85	0.34	1.71	5.79	19.89	2.58	2.00
Nash. & Decatur Div.*.	123	22	49,719	2,260	30.33	17.08	15.91	1.230	10.90	4.62	0.25	1.76	6.03	25.37	1.89	2.30
South & North Alabama*.	189	34	92,298	2,427	34.23	16.84	14.60	1.390	6.09	5.18	0.23	0.63	5.67	17.89	1.75	2.60
Evansville, Ind. & Nash. Div.*.	135	25	60,849	2,434	36.70	21.8	13.00	1.31	4.17	3.62	0.21	1.38	5.97	15.35	1.29	1.75
Mobile & Montgomery*.	180	20	47,211	2,361	32.28	14.00	11.67	1.310	4.55	4.60	0.44	0.61	6.81	16.81	2.79	1.90
Marquette, Houghton & Ontonagon.	68	18	14,415	801	44.12	18.86	34.89		0.06	13.78	0.65		5.71	20.78		
Missouri, Kansas & Texas*.	795	86	316,177	3,605	31.69	17.78	16.20	1.230	3.93	4.78	0.42	0.50	6.26	15.99		
N. Y., Penn. & Ohio, 1st and 2d Divs.	228	79	237,016	3,011	39.12	17.43	14.40		6.14	1.91	0.44	1.30	5.07	14.00	2.26	2.60
Ind. & Ohio Div.*.	197	49	156,363	3,191	34.57	25.48	17.30		2.50	7.18	0.37	1.63	5.90	16.14	2.41	2.90
Maioning Div.*.	88	46	127,477	2,771	44.65	22.04	20.60		3.98	5.06	0.38	0.85	5.07	15.34	2.16	2.90
Northern Central, Elmira & Can. Div.*.	147	46	192,792	2,235	28.74	21.74			4.63	4.47	0.45		6.29	17.24	1.90	2.40
Union Div.*.	129	169	353,321	2,104	32.04	16.81			5.80	9.70	0.80		11.30	3.20	3.36	
Amboy Div.*.	186	47	93,102	2,100	48.72	16.81			4.30	6.60	0.50		11.40	3.20	3.37	
Belvidere Div.*.	143	38	61,032	1,607	35.38	16.25			4.90	9.10	0.70		14.40	3.20	3.37	
Philadelphia Div.*.	172	139	462,734	2,597	25.19	12.91			8.09	5.10	0.60		13.70	1.20	2.88	
Midland Div.*.	122	102	297,019	2,912	26.20	16.84			5.50	4.80	0.50		10.80	1.20	2.88	
Pittsburgh Div.*.	226	100	509,483	2,634	24.84	12.69			6.00	4.90	0.60		11.50	1.20	2.88	
Tyrone Div.*.	111	24	42,501	1,771	23.71	30.00			8.20	5.10	0.50		13.80	1.20	2.88	
West Penn. Div.*.	104	29	39,297	1,991	37.45	38.16			10.10	3.30	0.30		13.70	1.20	2.88	
Lewistown Div.*.	63	10	16,674	1,672	25.35	15.69			2.20	4.80	0.50		7.50	1.20	2.93	
Bedford Div.*.	37	6	14,316	2,360	21.17	25.04			1.49	5.29	0.30		6.70	1.20	3.01	
Frederick Div.*.	100	8	29,109	2,514	33.69	18.52			6.70	7.80	0.60		15.10	2.54	3.64	
Pittsburgh, Va. & Charleston Div.*.	39	29	16,510	1,976	34.91	17.48			2.60	4.60	0.40		6.00	1.30	3.48	
Pitts. Ft. Wayne & Chi., East. Div.*.	371	151	433,872	2,873	41.64	20.10	16.10	0.998	4.01	3.85	0.40	1.71	6.44	16.87	1.52	1.52
Western Div.*.	281	115	334,327	2,900	40.53	21.14	24.00	0.841	5.49	4.00	0.40	1.74	6.28	16.87	1.63	1.63
Pitts., Cin. & St. Louis, Little Miami	197	39	93,460	2,535	42.91	12.42	17.20	0.951	5.90	6.37	0.50	2.85	6.04	20.96	2.93	1.50
P. C. & St. L. Div.*.	242	103	266,582	2,407	37.23	19.13	23.09	0.730	4.73	5.50	0.39	2.31	5.96	18.88	2.90	2.25
Quebec, Montreal, Ottawa & Occident	138															
La. Western Div.*.	337	46	104,546	2,273	38.77	16.56	16.41		3.65	3.98	0.39		6.38	14.00	1.30	2.50
Talbot, Peoria & Warsaw.	250	113	343,119	3,038	25.16	10.62	25.17	0.980	2.65	5.98	0.43	1.00	5.97	16.51	1.50	
Wahash, St. L. & P., Ohio & Ind. Div.*.	110	91	278,716	3,063	33.00	18.00	21.06	0.970	3.30	4.57	0.33	0.97	6.53	15.51	1.50	
Illinois Division*.	138	18	39,543	2,197	45.54	20.41			2.30	8.30	0.40		6.10	11.40		
West Jersey*.																

* Five empty cars rated as three loaded ones.
* Switching engines allowed 6 miles per hour; helping engines, actual distance run.
* Switching engines allowed 6 miles per hour.
* Not estimated.
* Two empty cars rated as one loaded one.
* Switching and work-train engines allowed 6 miles per hour.

** Three empty cars rated as two loaded ones.
** Switching engines allowed 6 miles per hour; five empty cars rated as three loaded ones.
** Switching engines allowed 6 miles, work-train 8 miles per hour.
* Engineers' firemen's wages not included in cost.
The ton of coal is 2,000 lbs., unless otherwise noted; 25 bushels counted to the ton.